

# 14

## Synthesis of results: towards an archaeology of the southern Curtis Coast

### Introduction

This chapter synthesises the data detailed in the preceding eight site report chapters and also draws on survey data discussed earlier. It focusses on major indices used to identify continuity and change in the regional archaeological record. These data have quantitative and qualitative dimensions. First, the distribution of radiocarbon dates is used to describe and evaluate regional chronology, with comparisons drawn from the broader southeast Queensland area. Second, site contents are examined with an emphasis on shell, fish bone, charcoal and stone artefacts. Shellfish remains inform on diet breadth, intensity of occupation and habitat preferences. Fish bone and other marine vertebrate remains contribute to an understanding of the antiquity of marine fishing in the wider region and the role of fishing in the local subsistence economy. Charcoal abundance is associated with the intensity of human land-use. Stone artefacts are assessed for raw material procurement patterns, technological strategies and potential exchange relationships. Third, regional variation in site structure is examined to elucidate patterns in the size and form of sites through time and space. Covariation in quantitative and qualitative attributes of these data categories is employed to explore patterns in the regional archaeological record. Finally, a descriptive model is proposed linking the identified patterns to broader frameworks of interpretation with a view to building an understanding of Aboriginal lifeways on the southern Curtis Coast throughout the late Holocene.

This synthesis employs broad chronological units (500 year intervals), commensurate with the general degree of confidence available for individual sites in terms of both site integrity and temporal resolution. This approach balances the need for maximum detail against limitations in data resolution. Although site integrity was generally high — based on the consideration of stratigraphy, age-depth relationships and bivalve conjoin analyses — detailed analyses of integrity were not undertaken for deposits lacking bivalve remains suitable for conjoin analysis (see Chapters 6–13 for details). Similarly, temporal resolution for some assemblages is constrained by variation in regional  $\Delta R$  signatures related to estuary-specific patterns of water circulation,

sedimentation and hinterland geology (see Chapter 4). While these broad time-blocks will mask some variability in individual assemblages, the method is a robust one for indicating temporal trends across the region and broadly characterising regional patterns in assemblage variability.

## Regional site chronology

The radiocarbon chronology of Aboriginal occupation of the southern Curtis Coast is informed by studies of local estuarine and marine reservoir effects undertaken as part of this research (Chapter 4) and the site-specific evaluations of the precision and accuracy of individual radiocarbon determinations presented in site report chapters (Chapters 6–13; see also Chapter 2). The comparability and reliability of the radiocarbon dataset are further enhanced by the restriction of sample preparation to a single laboratory (University of Waikato Radiocarbon Dating Laboratory) and actual dating to two laboratories: the University of Waikato Radiocarbon Dating Laboratory for conventional radiocarbon dates and the Rafter Radiocarbon Laboratory for accelerator mass spectrometry dates. This strategy minimises the effects of interlaboratory variability in sample preparation and counting procedures and as a result a high level of confidence can be placed in the validity of the individual assays which underpin the general patterns revealed by analysis of the radiocarbon date assemblage.

Several techniques were used to examine regional occupational chronology based on the distribution of available radiocarbon dates (Figs 14.1–14.6). Despite the limitations inherent in all analytical methods employed (see below), they are useful for characterising broad, long-term patterns in the distribution of radiocarbon dates. If a detailed understanding of the structure of the radiocarbon date record is available, these techniques should provide a general view of the structure of regional occupation trajectories. In addition to the technical issues noted above, the validity of trends identified in the radiocarbon record is dependent on a number of basic assumptions. Chief among these are those concerning sample adequacy: are cultural deposits adequately dated and are there biases in the strategy adopted in the selection of samples that might skew the regional radiocarbon record towards certain periods or site types? A large suite of dates from a wide range of site types, contexts and time periods was obtained in an attempt to ensure sample adequacy. Particular attention was paid to dating termination deposits critical to identifying patterns of abandonment (David and Wilson 1999).

In total, 66 radiocarbon dates from 12 sites on the southern Curtis Coast are considered in this analysis (Appendix 1). After Pettitt et al. (2003:1690), outliers or 'rogue' determinations are defined as 'dates that are statistically distinct from the main group/sequence at  $2\sigma$ '. Individual determinations were assessed on a site-by-site basis to identify and remove rogue dates. Various chronometric hygiene procedures for large suites of radiocarbon dates are available (e.g. Meltzer and Mead 1985; Spriggs and Anderson 1993), but to avoid introducing further biases through selective exclusion of dates, dates were only rejected where a clear inversion or disjunction could be identified on the basis of comparing individual determinations to a sequence of dates (Ulm and Hall 1996). Following this protocol, eight dates from five sites were excluded from the analysis owing to problems of association or non-cultural status (Table 14.1).

Figure 14.1 shows the minimum and maximum  $1\sigma$  calibrated age-ranges for the youngest and oldest determinations respectively available for each site on the southern Curtis Coast. The  $1\sigma$  age-range was selected to reduce the potential for overestimating the occupation span of sites and attempt to avoid techniques which emphasise long-term continuity of occupation. Caution should be exercised in interpreting the span presented for the Round Hill Creek Mound as it is based on a single determination of unknown provenance in the overall sequence of occupation of this site (see Chapter 2). The distribution of occupation spans suggests that the region has been continuously

Table 14.1 Radiocarbon dates from the southern Curtis Coast excluded from chronological analyses.

SITE	LAB. NO.	COMMENT
Eurimbula Site 1	Wk-5215	Anomalous. Out of sequence.
Ironbark Site Complex	OZD-756	Non-cultural. Sediment core.
Mort Creek Site Complex	Wk-3942	Non-cultural. Chenier.
Mort Creek Site Complex	Wk-3943	Non-cultural. Chenier.
Mort Creek Site Complex	Wk-3938	Non-cultural. Chenier.
Mort Creek Site Complex	Wk-3940	Non-cultural. Chenier.
Seven Mile Creek Mound	NZA-12272	Anomalous. Out of sequence.
Tom's Creek Site Complex	NZA-13385	Non-cultural. Sediment core.

occupied from at least 4,000 years ago to the present, with increasing numbers of sites occupied through time. Abandonment of at least two sites — Seven Mile Creek Mound and the Mort Creek Site Complex — is clear, although less confidence can be placed in the termination dates available for the Pancake Creek Site Complex and Middle Island Sandblow Site owing to the very large size of these sites. In the early period there appears to be little, if any, overlap in the occupation of Seven Mile Creek Mound and Mort Creek Site Complex. Only Eurimbula Site 1 is coeval with occupation at Mort Creek Site Complex.

Figure 14.2 provides an estimate of the number of sites occupied in 500 year periods based on the mid-points of calibrated age-ranges and linear interpolations between radiocarbon dates. Other studies have shown that this measure tends to inflate the number of recent sites occupied because in the absence of termination dates, sites are assumed to be occupied to the present if there are no major stratigraphic disconformities to suggest otherwise (e.g. Smith and Sharp 1993; Ulm and Hall 1996). For the southern Curtis Coast data, however, considerable confidence can be placed in this measure as dating strategies specifically targetted both initiation and termination deposits. Figure 14.2 shows initial low numbers of occupied sites with major expansion across the region only taking place in the last 1,000 years after a period of reduced site occupation between 1,000 and 1,500 years ago. These data indicate that more individual places in the landscape were incorporated into settlement-subsistence strategies through time.

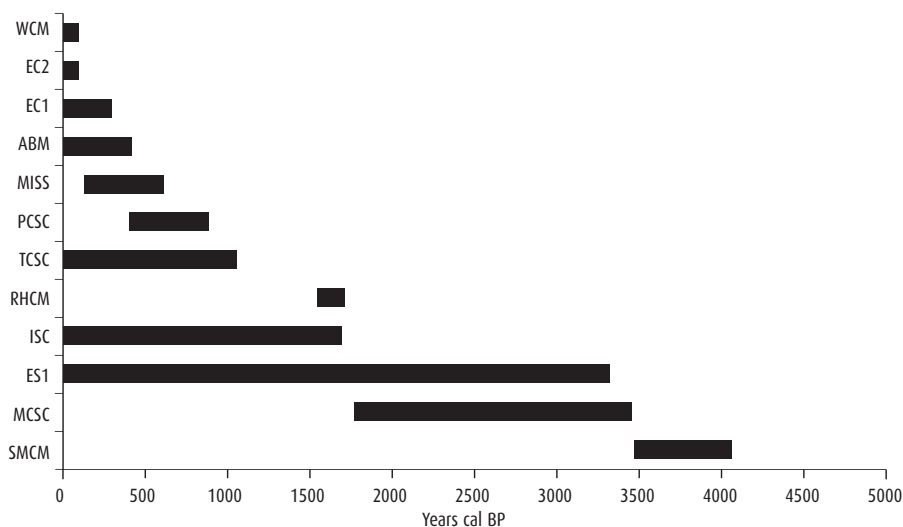


Figure 14.1 Occupation spans of dated sites on the southern Curtis Coast, based on 1σ calibrated age-ranges. Note that a span of 100 years is estimated for the modern dates reported for WCM and EC2.

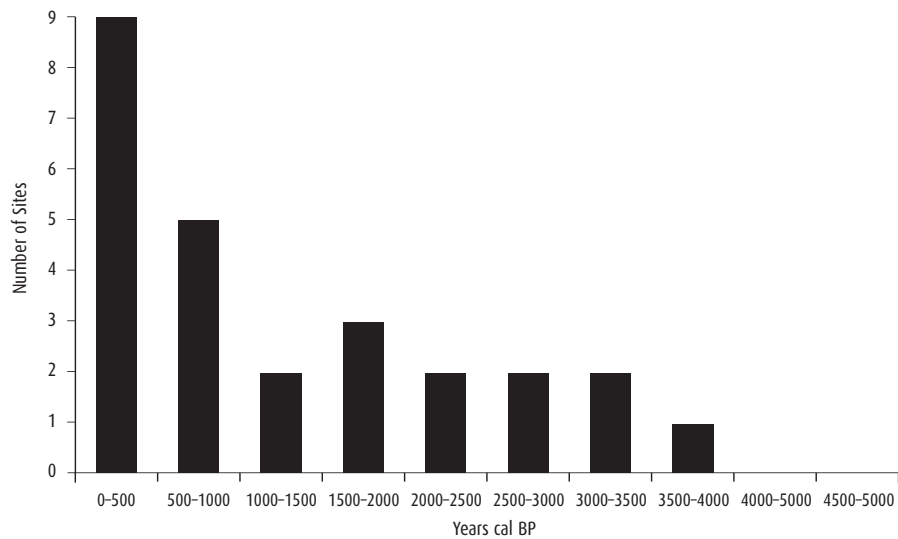


Figure 14.2 Estimated number of dated sites occupied on the southern Curtis Coast in each 500 year period, based on the mid-points of calibrated age-ranges.

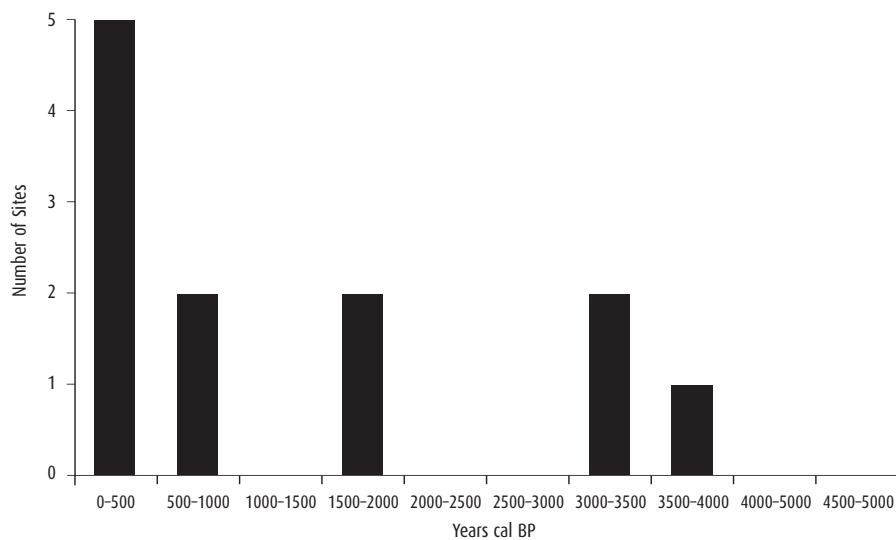


Figure 14.3 Estimated number of new sites established on the southern Curtis Coast in each 500 year period. Note that the mid-point of the calibrated age-range of the oldest date available for each site is assumed to be the basal age.

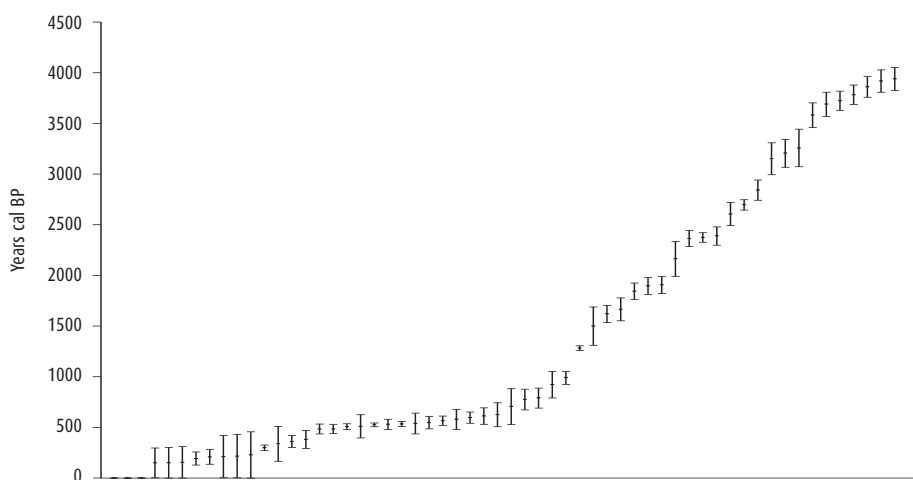


Figure 14.4 Calibrated radiocarbon ages from the southern Curtis Coast (n=58) arranged in order of increasing age. Error bars show the 1 $\sigma$  calibrated age-range. Note the apparent gap between 1,050–1,250 years ago.

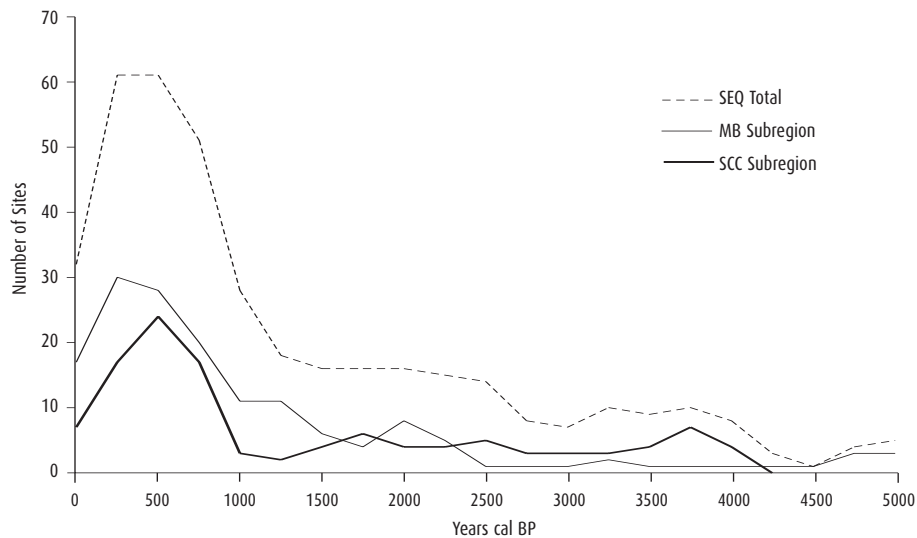


Figure 14.5 Number of sites on the southern Curtis Coast with central calibrated radiocarbon dates falling in each 500 year period, measured at 250 year intervals. For comparison, the same data are shown for all of southeast Queensland and the Moreton Bay region.

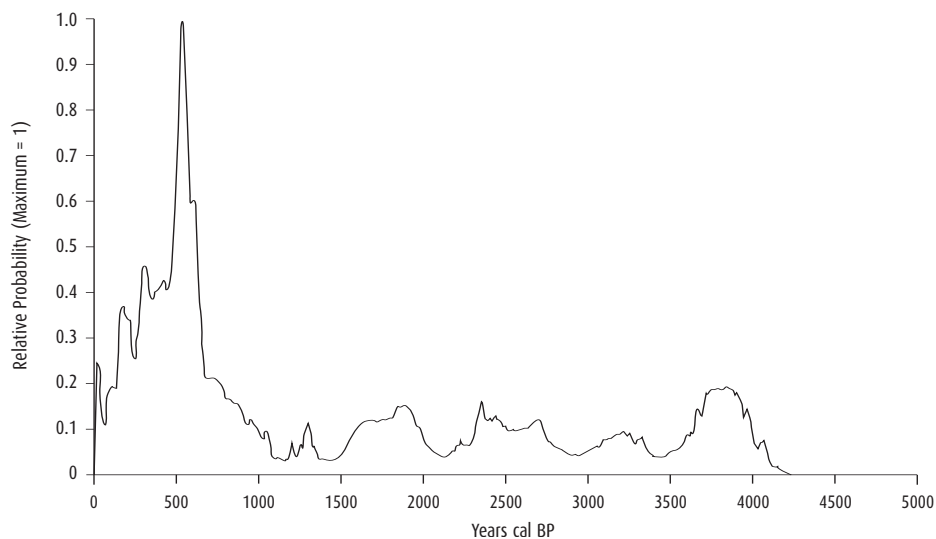


Figure 14.6 Summed probability plot of all calibrated radiocarbon ages (n=56) normalised to a maximum of one. Note that the two modern dates reported for WCM and EC2 are excluded.

Figure 14.3 uses the oldest date available for each site to estimate the rate of establishment of new sites through time. This technique highlights patterns of site creation rather than occupation and use of sites. Bird and Frankel (1991a:4) have criticised this method for, among other things, ‘assuming continuity of occupation after first use, and lumping together dates from sequences and short-term occupations’, thereby denying ‘the possibility of demonstrating discontinuity or the reuse of sites after a significant gap in occupation’. These criticisms do not apply here, however, as the method does not assume continuity of site use and examines site establishment, requiring the use of initial dates for site occupation (and, in a variation of this technique, reoccupation after long breaks in occupation; see Smith and Sharp 1993). Two clearly separated periods of site establishment are evident: sites established before 3,000 BP and those established after 2,000 BP. A comparison of Figures 14.1 and 14.3 shows that in the earlier group, two sites (Seven Mile Creek Mound and Mort Creek Site Complex) were established and then abandoned before the more recent period of site establishment over the last 2,000 years. The only site where occupation spans

these two periods (Eurimbula Site 1) exhibits quantitatively and qualitatively different patterns of use between the earlier and later periods (see below). There is also a gap in site establishment between 1,000 and 1,500 cal BP.

Figure 14.4 shows the calibrated radiocarbon ages from the southern Curtis Coast arranged in order of increasing age. The error bars denoting the  $1\sigma$  calibrated age-range of each date overlap one another for almost the entire sequence, except for an apparent gap between 1,050 and 1,250 years ago. This gap coincides with the gap in site creation (Fig. 14.3) and a reduction in the estimated number of occupied sites (Fig. 14.2) noted above. For reasons discussed below, it may be significant that the first two dates older than this gap are both from the quarry at the Ironbark Site Complex.

Figure 14.5 deploys a modified version of Rick's (1987) method to examine broad patterns in the frequency of radiocarbon dates on the southern Curtis Coast and comparative datasets drawn from southeast Queensland. Rick's method is based on the premise 'that the number of dates is related to the magnitude of occupation' (Rick 1987:55, original emphasis) and that 'all things being equal, more occupation produces more carbon dates' (Rick 1987:56). Implicitly, this method assumes that radiocarbon samples are selected at random from an unbiased archaeological record. Rick (1987) and Holdaway and Porch (1995) have noted several limitations of this approach, particularly those relating to the non-random nature of the availability of charcoal for dating structured by taphonomic factors affecting the representation both of sites and of charcoal within deposits, as well as sampling and research biases. However, as Lourandos and David (1998) have noted, some of these problems are minimised by the preferential dating of older deposits by archaeologists in Australia, which should create a bias towards the representation of older dates in the moving average, rather than more recent occupation. Therefore, any log-decline in preservation of materials with increasing age is offset by a log-increase in representation (i.e. sampling) of older material for radiocarbon dating. A moving average was calculated of the number of calibrated radiocarbon dates in sliding 500 year intervals measured every 250 years. Therefore, the measured interval at 1,500 years includes all of the dates between 1,250 and 1,750 BP and the interval at 1,750 years all the dates between 1,500 and 2,000 cal BP. The moving average method broadens the temporal influence of each date and results in a smoothed curve. This method has been adopted in several Australian studies using large regional suites of radiocarbon dates such as Bird and Frankel (1991a) for western Victoria and southeast South Australia, Holdaway and Porch (1995) for southwest Tasmania, David and Lourandos (1997, 1999; see also David 2002; Lourandos and David 1998) for southeast Cape York Peninsula, the semi-arid zone and arid zone, and Ulm and Hall (1996) for southeast Queensland.

For comparison, Figure 14.5 also incorporates an updated and expanded radiocarbon dataset for all of southeast Queensland which includes a further 15 sites and 96 dates since the compilation by Ulm and Hall (1996). These additional data for southeast Queensland are extracted from Ulm and Reid (2000) and subsequent updates (Ulm and Reid 2004). The southern Curtis Coast radiocarbon dataset contributes 71% (n=66) of the new dates available and 80% (n=12) of the new sites. Other new data include dates from recently excavated sites (Alfredson and Kombumerri 1999; McNiven et al. 2002; Ross and Duffy 2000) and redating of previously investigated deposits (Alfredson 2002; Gowlett et al. 1987; Mackenzie 2002) (see Ulm and Reid 2004 for details). The current southeast Queensland radiocarbon dataset contains 245 dates from 73 sites. Since the focus of this study is on the mid-to-late Holocene, the 21 dates from five sites in this dataset with calibrated age mid-points older than 5,000 cal BP were excluded as were the 26 dates from 12 sites exhibiting problematic or non-cultural associations (see Table 14.1; Ulm and Hall 1996:48; Ulm and Reid 2000, 2004). In total, the southern Curtis Coast radiocarbon dataset comprises 27% (n=66) of the radiocarbon dates available for archaeological sites in southeast Queensland and 16% (n=12) of the dated sites. The 66 radiocarbon dates available for the southern Curtis Coast represent the largest group of dates available for any subregion on the Queensland coast after Moreton Bay

(n=81) and by far the highest rate of dates/site of 5.4 (compare with 2.6 dates/site for Moreton Bay). Subregional data for Moreton Bay shown in Figure 14.5 are drawn from this expanded southeast Queensland dataset. The Moreton Bay dataset only contains dates from sites fringing, or on the islands of, Moreton Bay. There is marked synchronicity in the timing of changes in the Moreton Bay and southern Curtis Coast datasets, despite Moreton Bay starting from a higher base. These data support the findings presented in an earlier study by Ulm and Hall (1996) which identified significant increases in the number of occupied sites and the rate of site establishment after 1,200 cal BP. However, this technique allows higher resolution insights than those available for previous techniques using 500 year intervals, showing marked increases around 700 years ago.

Figure 14.6 shows the summed calibrated probability of all calibrated radiocarbon ages by year, normalised to a maximum of one and excluding the two modern determinations (Wk-7689; Wk-7681). The summed probability distribution 'represents the probability that independent events A OR B occurred at a particular time' (Stuiver et al. 2002), and can therefore be used as a proxy for the probability of occupation in a particular period. Periods of low regional site use are common prior to 1,000 years ago. The high number of dates obtained for the Seven Mile Creek Mound are responsible for the platykurtic curve between 3,500 and 4,000 cal BP (see also Fig. 14.5). Increasing amplitude of relative probability peaks through time indicate a decrease in the spacing of dated occupation events across the southern Curtis Coast subregion after 1,000 BP. Periods of reduced regional occupation occur at 3,400, 2,900, 2,150, 1,400 and 1,150 BP as indicated by troughs of low probability in Figure 14.6. Only the periods around 1,400 and 1,150 cal BP, however, are coincident with clear quantitative and qualitative changes in the archaeological record of the region (see below). These are also the periods with the lowest probability of the occurrence of calibrated radiocarbon dates (Table 14.2). Again, within the last 1,000 years marked increases are evident around 700 years ago.

Table 14.2 Summed probability distribution of all calibrated radiocarbon dates available from cultural contexts on the southern Curtis Coast (n=56). Excludes the two modern determinations (Wk-7681; Wk-7689). 0\* indicates a modern age.

% AREA ENCLOSED	CAL BP AGE-RANGES	RELATIVE AREA UNDER PROBABILITY DISTRIBUTION
95.4	4078-3479	0.130
	3359-2980	0.049
	2855-2156	0.114
	2057-1508	0.106
	1346-1232	0.015
	1207-1184	0.003
	1065-0*	0.584

### Discussion

The archaeological dating program on the southern Curtis Coast reveals a near-continuous record of occupation from 4,000 cal BP to the present. From this time the estimated number of dated sites occupied in each 500 year period increases, with a major increase in the rate of site creation and representation of radiocarbon dates in the last 1,000 years, notably from around 700 cal BP. However, dating of surface cultural materials highlights marked differences in the age of archaeological materials exposed at the surface. Large suites of dates clearly demonstrate that both the Seven Mile Creek Mound and the Mort Creek Site Complex were abandoned in antiquity.

There is a clear disjunction in the pattern of regional occupation between sites created before 3,000 BP and those created after 2,000 BP. Although the region may not have been abandoned, significant decreases in the intensity of regional land-use are apparent. Eurimbula Site 1 is the only site which remains in use over this transitional period and even here only a single radiocarbon date (Wk-8553) spans the critical period between abandonment of the Mort Creek Site Complex

shortly before 1,900 years ago and first occupation of the Ironbark Site Complex at around 1,500 BP. The date of 1,790±60 BP (Wk-8553) on a sample of *A. trapezia* from Square E3, XU7, is associated with small quantities of cultural material (see Ulm et al. 1999a:120). Throughout the entire region only one other radiocarbon date associated with occupation dates to this time interval. An isolated date of 1,910±42 BP (Wk-10090) is available for a sample of *A. trapezia* obtained from a disturbed section at the Round Hill Creek Mound on the opposite bank of Round Hill Creek to Eurimbula Site 1. Further details about this site are currently unavailable, so the cultural context of this determination cannot be assessed (see Chapter 2). As both of these age determinations are on estuarine shell material, however, the accuracy of these two calibration calculations is dependent on the accuracy of the local estuarine reservoir correction factor calculated for Round Hill Creek. As noted in Chapter 4, although three shell/charcoal date pairs are available for the Round Hill Creek estuary, consideration of major discrepancies between the paired results left a single result ( $\Delta R = -305 \pm 61$ ) considered free of obvious interpretation problems. This value was adopted as a first approximation, although less confidence was placed in it than those for other estuaries where more than one result is available. Table 14.3 shows that if these two radiocarbon dates are calibrated using the local open ocean result rather than the single estuary-specific  $\Delta R$  value, both calculations place the dated material into the last 1,500 years, suggesting the possibility of a short hiatus of occupation at Eurimbula Site 1. Although the results of the marine reservoir study of Round Hill Creek are problematic, they highlight an otherwise unconsidered source of error in evaluating the chronology of occupation.

Table 14.3 Radiocarbon ages from the southern Curtis Coast dating to the 1,500–2,000 cal BP interval, calibrated using various  $\Delta R$  values.

SITE	LAB. NO.	$^{14}\text{C}$	CALIBRATED AGE/S $\Delta R = -305 \pm 61$ (CAL BP)	CALIBRATED AGE/S $\Delta R = +10 \pm 7$ (CAL BP)
Eurimbula Site 1	Wk-8553	1790±60	1869(1683)1479	1447(1307)1228
Round Hill Creek Mound	Wk-10090	1910±42	1980(1816)1623	1534(1439)1338

The major trend evident in all analyses is the dramatic increase in the number of sites created, sites occupied and radiocarbon dates represented over the last 1,000 years, and particularly the last 700 years. The trend is not gradual, but rather implies a disjunction in the regional trajectory of occupation. This pattern is quite distinct from that evident in the preceding 3,000 years of occupation and implies a dramatic reordering of land-use patterns, with no precedent in the history of occupation of the region.

## Regional site contents

### Shellfish remains

Regional shellfish gathering focussed on a small proportion of the total available taxa, with collection strategies concentrated on shallow estuarine environments. Although 53 taxa (21 marine bivalves; 1 freshwater bivalve; 27 marine gastropods; 4 terrestrial gastropods) were recovered from archaeological deposits, three taxa — rock oyster (*Saccostrea glomerata*), mud ark (*Anadara trapezia*) and hairy mussel (*Trichomya hirsutus*) — comprise over 95% of the shell by weight and over 72% by MNI (Table 14.4). Rock oyster alone accounts for over 70% of the regional shell assemblage by weight.

Table 14.4 Top 10 shellfish taxa from all excavated deposits ranked by weight and minimum number of individuals. Note that the four taxa of terrestrial gastropod have been excluded.

SPECIES	COMMON NAME	% WEIGHT	RANK	SPECIES	COMMON NAME	% MNI
<i>S. glomerata</i>	rock oyster	73.38	1	<i>S. glomerata</i>	rock oyster	57.08
<i>A. trapezia</i>	mud ark	15.77	2	<i>T. hirsutus</i>	hairy mussel	9.57
<i>T. hirsutus</i>	hairy mussel	6.74	3	<i>A. trapezia</i>	mud ark	6.28
<i>P. sugillata</i>	pearl oyster	1.34	4	<i>P. sugillata</i>	pearl oyster	2.37
<i>P. ebininus</i>	hercules club whelk	1.28	5	<i>N. balteata</i>	common nerite	2.05
<i>N. balteata</i>	common nerite	0.91	6	<i>B. paivae</i>	oyster drill	1.38
<i>V. australis</i>	Australian mud whelk	0.10	7	<i>V. australis</i>	Australian mud whelk	1.26
<i>C. fibula</i>	spiny oyster	0.08	8	<i>Latirus</i> sp.	-	1.00
<i>B. paivae</i>	oyster drill	0.04	9	<i>P. ebininus</i>	hercules club whelk	0.98
<i>B. nanum</i>	periwinkle	0.02	10	<i>B. nanum</i>	periwinkle	0.92
Total		100		Total		100

Shellfish remains are dominated by the large contribution of the Seven Mile Creek Mound which comprises the entire shell assemblage in the 3,500–4,000 cal BP interval (weighing over 100kg) (Fig. 14.7). If the mound assemblage is removed from consideration, comparatively little shell is deposited over the last 3,500 years. Several other patterns are also evident. There is a clear reduction in the quantity of shell deposited across the region between 1,000–1,500 years ago (less than 1kg) coincident with the period of reduced regional occupation identified in the radiocarbon dataset, with increases in the last 1,000 years mirrored in other indicators for increased regional occupation.

Bimodality in the distribution of key shellfish taxa through time was noted in several assemblages (see Figs 12.15, 13.13). Covariation of mudflat-associated bivalves (*A. trapezia*) versus mangrove-associated bivalves (*S. glomerata*) and gastropods (*T. telescopium*, *N. balteata*) appears to be directional, with an overall trend towards a decline in the representation of *A. trapezia* through time. Although rock and shell debris beds suitable for oyster colonisation occur in estuaries at the north of the study region (Seven Mile Creek, Mort Creek, Worthington Creek), mangroves provide the major oyster substrate across southern estuaries such as Round Hill Creek, Eurimbula Creek, Middle Creek and Pancake Creek. The presence of oyster is therefore directly related to the availability of mangrove substrates in these estuaries. The timing of the bimodal trend varies between estuaries across the region, reflecting localised patterns of mangrove colonisation and sedimentation conditions. The pattern is clearest at Eurimbula Site 1 and is complemented by geomorphological and palynological data available for Round Hill Creek. Although mangrove pollen is present in cores by 3,000 BP, geomorphological data indicate an expansion of mangrove communities in the last 1,000 years coincident with a recent phase of sedimentation. Similarity coefficients calculated on the shell assemblage of Eurimbula Site 1 show a 70.3% similarity between the 0–500 year and 500–1,000 year assemblages, but only a 40.3% similarity between the 0–1,000 and 1,000–2,000 year assemblages. These values indicate a significant shift in the representation of taxa in the deposit, lending support to an argument for changes in local resource availability linked to mangrove expansion.

Another pattern is discernable in the diversity of shell assemblages through time, as calculated by the Shannon-Weaver Function ( $H'$ ). If the Seven Mile Creek Mound is excluded (the 3,500–4,000 year cal BP column in Fig. 14.8), there is a weak overall trend indicating greater diversity after 1,000–1,500 BP (see Fig. 14.8). This pattern may indicate a broadening of the suite of taxa targeted by gathering strategies.

## Fish remains

Fish are likely to have provided most of the protein for people on the southern Curtis Coast despite the relatively low representation of this material compared with shellfish (but see Erlandson 1988, 1991). Identified fish remains indicate targeting of a range of shallow water estuarine species, including whiting (*Sillaginidae*), flathead (*Platycephalidae*), bream, tarwhine and snapper (*Sparidae*), mullet (*Mugilidae*) and catfish (*Ariidae*). The pattern of fish bone distribution closely follows that of shellfish, with a decrease between 1,000–1,500 years ago and major increases in the last 1,000 years (Fig. 14.9). The shell and fish bone datasets should not be considered entirely independent, however, as it is likely that fish bone survival in the archaeological record is closely linked to shell abundance because the shell matrix provides more alkaline conditions (McNiven 1991a).

Two major patterns in the distribution of fish bone stand out. First, the ratio of fish bone to shell is dramatically different between early and later periods of occupation. In the period 3,500–4,000 BP there is 1g of fish bone for every 3,942g of shell whereas over the last 500 years the ratio is an order of magnitude lower at 1:435. A number of factors could contribute to this pattern. For example, a smaller proportion of fish bone may have been deposited in the earlier period, related specifically to behaviours involved in the construction of the Seven Mile Creek Mound. Alternatively, different taphonomic agents may have been operating in the earlier time interval to selectively remove fish bone from the discard assemblage. This seems unlikely, however, as the Seven Mile Creek Mound pre-dates the probable arrival of the dog in southeast Australia, identified as a major contributor to the removal of small vertebrate remains (Walters 1984, 1985). An alternative explanation might be found in shifting subsistence and settlement strategies towards an increased emphasis on a broad range of coastal resources (see below).

The second major pattern is the unexpected antiquity of marine fishing in the region. Fish remains are a rare component in southeast Queensland faunal assemblages pre-dating 1,000 years ago (Ulm 2002a; Walters 1992a). Three sites on the southern Curtis Coast — Seven Mile Creek Mound, Mort Creek Site Complex and Eurimbula Site 1 — contain fish bone before 2,000 BP, effectively doubling the number of sites in southeast Queensland with fish bone assemblages dating to this period.

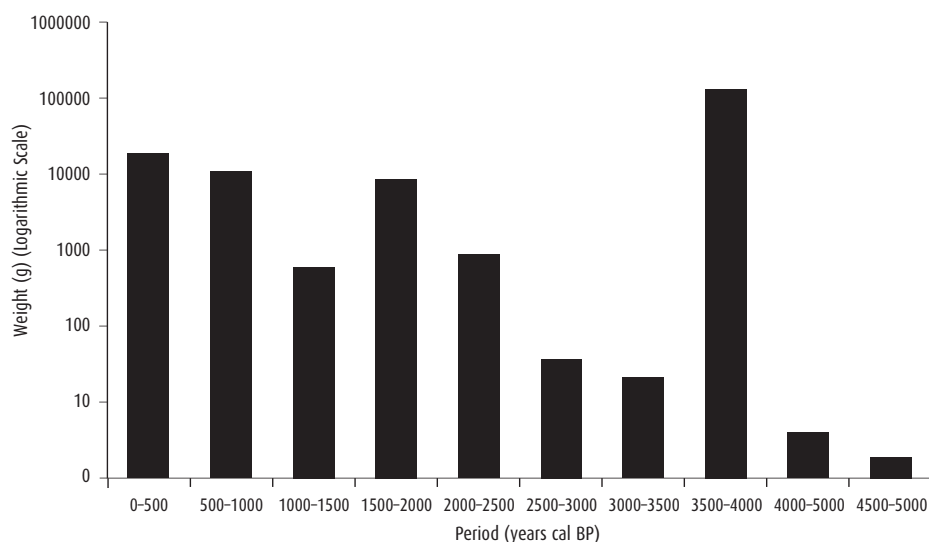


Figure 14.7 Total weight of shell recovered from all excavated sites per 500 year interval. Note logarithmic scale.

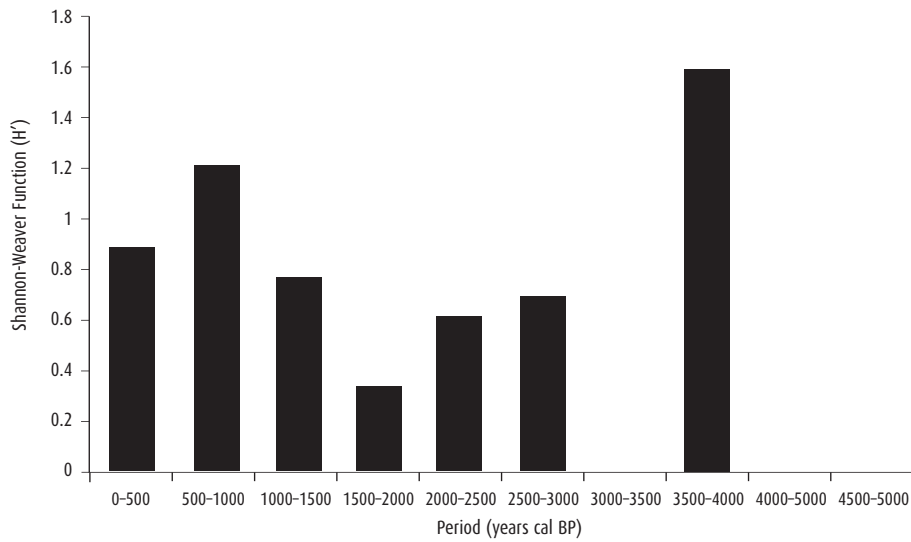


Figure 14.8 Shellfish diversity calculated using the Shannon-Weaver Function (H') per 500 year interval.

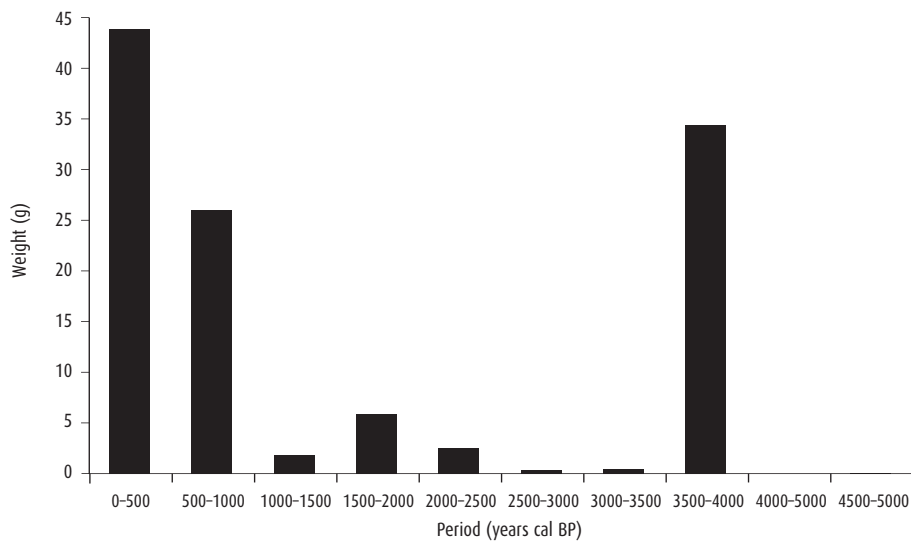


Figure 14.9 Total weight of fish bone recovered from all excavated sites per 500 year interval.

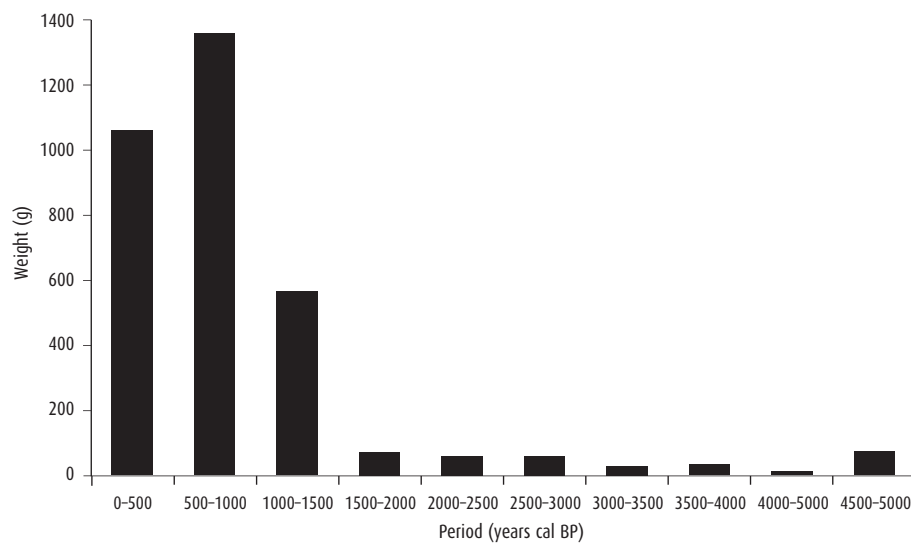


Figure 14.10 Total weight of charcoal recovered from all excavated sites per 500 year interval.

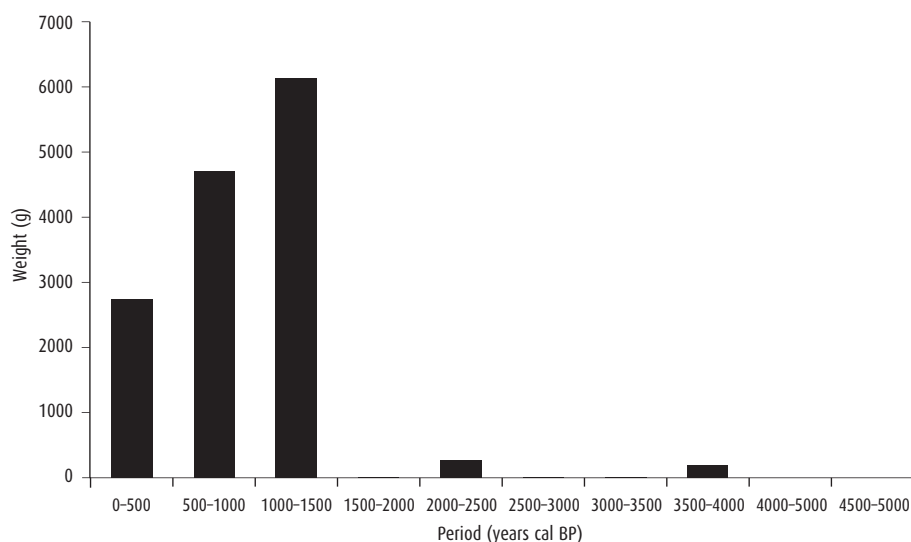


Figure 14.11 Total weight of stone artefacts recovered from all excavated sites per 500 year interval.

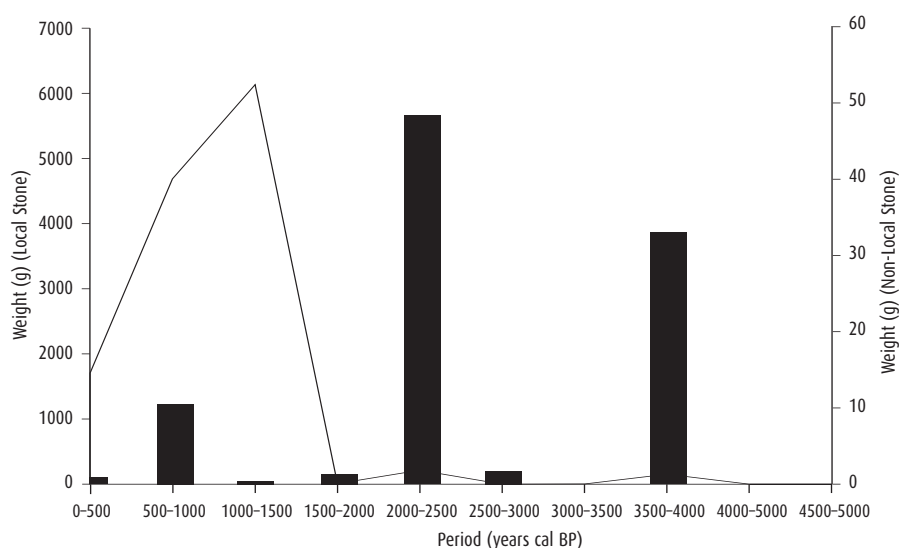


Figure 14.12 Abundance of local (line) versus non-local (black columns) stone artefact raw materials per 500 year interval.

## Charcoal

As noted in several of the site reports, low quantities of charcoal are represented in culturally-sterile deposits, indicating continuous deposition of charcoal throughout the coastal landscape. Charcoal representation dramatically increases in the last 1,500 years and coincides with increased rates of regional site occupation and increased rates of shellfish and fish discard (Fig. 14.10).

## Stone artefacts

Significant changes in stone artefact technologies and patterns of raw material procurement are evident over the last 4,000 years (Figs 14.11–14.12). Before c.1,500 years ago, stone artefact assemblages are characterised by a larger proportion of high quality siliceous stone (including volcanic ash, chert and silcrete), much of which is thought to have a non-local origin, and which was curated for maximum use-life. From around 1,500 years ago there is a shift towards the almost exclusive use of local stone resources (especially rhyolitic tuff, but also microgranite and quartz) (Fig. 14.12). This localisation in the sourcing of lithic raw materials is accompanied by an alteration in stone reduction strategies towards informal or expedient tool manufacture, use and discard for

utilitarian artefacts (i.e. 'minimally altered and are not noticeably specialised' (Mulvaney and Kamminga 1999:221)). Although a similar late Holocene trend identified in southwestern Victoria has been linked to a widespread decline in small tool technology (Fresløv and Frankel 1999; Zobel et al. 1984), the pattern clearly denotes major changes in stone procurement and use strategies on the southern Curtis Coast. McNiven and Hiscock (1988) have linked raw material transport and reduction strategies which maximise reduction potential to the general absence of good quality siliceous stone close to the coast in southeast Queensland. Several indirect lines of evidence indicate that it was during the last 1,500 years that manufacture of edge-ground hatchets on local raw materials commenced, forming the major curated component of recent stone artefact assemblages (see Ulm et al. 2005).

Although the general pattern of stone artefact abundance corresponds with that observed for other cultural materials, there is a clear and dramatic peak between 1,000–1,500 BP, at a time when other indicators suggest an overall reduction in regional occupation (Fig. 14.11). This peak largely comprises material recovered from bank deposits at the Ironbark Site Complex. Although there is indirect evidence for use of the quarry prior to this time in the form of artefacts manufactured on rhyolitic tuff recovered from c.3,000 year old deposits at Eurimbula Site 1, it is not until around 1,500 BP that the first evidence for systematic and large-scale extraction of materials from the quarry occurs. Despite the presence of numerous outcrops of rhyolitic tuff throughout the region, the ubiquitous stone artefacts manufactured on this material noted on the surface of sites and recovered from excavated deposits appear to largely, if not exclusively, derive from the Ironbark Site Complex quarry (Chapter 9; Ulm et al. 2005).

The other major technological change in stone artefact technologies in the last 1,500 years is the appearance of large implements associated with plant processing. Although not recovered from excavated contexts, numerous large stone artefacts, some exhibiting bevelling, were observed eroding from bank deposits dating to the last 500 years at both Eurimbula Site 1 and Ironbark Site Complex, and on the surface of the Middle Island Sandblow Site. Most of these artefacts are manufactured on local rhyolitic tuffs and ignimbrites. Smith's (2003) study of bevelled artefacts from Bribie Island also revealed a high proportion of these raw material types. Residue and use-wear analyses of a small sample of the southern Curtis Coast implements by Lamb (2003) demonstrated the presence of starchy residues associated with processing the rhizome of starch-rich plants, such as fern root (*Blechnum indicum*).

Excavated stone artefact assemblages dating to the last 1,500 years and surface observations indicate that all stages of stone artefact manufacture are represented at major sites in the region (i.e. Tom's Creek Site Complex, Eurimbula Site 1, Ironbark Site Complex, Pancake Creek Site Complex). The high levels of expediency and redundancy and the small quantities of formal tools evident in these assemblages support an interpretation of relatively low regional mobility at these sites, particularly over the last 1,000 years (Parry and Kelly 1987). In general, there is a decrease in the flaking quality of stone used to manufacture artefacts in the region over the last 4,000 years. The dominance of rhyolitic tuff in assemblages dating to the last 1,500 years reflects raw material distribution which is embedded in local settlement-subsistence systems rather than deriving from non-local transport or exchange. The increase in the quantity of local raw materials in sites across the region is related to broader patterns of restructuring of land-use. The low numbers of artefacts coupled with the presence of non-local materials and curated forms in earlier sites provides further indications of more mobile settlement patterns before 1,500 BP.

The flaked stone artefact assemblage is similar to those described elsewhere in coastal southeast Queensland, such as Fraser Island (McNiven and Hiscock 1988; McNiven et al. 2002), Cooloola (McNiven 1990a, 1992a, 1992b) and Bribie Island (Smith 1992, 2003), with few formal artefact types, a dominance of flaked pieces, and generally small artefact size. In fact, McNiven et al. (2002) reported that the entire stone artefact assemblage recovered from Waddy Point 1

Rockshelter on Fraser Island had an average weight of less than 0.8g. Smith (2003:171) has associated this general pattern with ‘opportunistic (or expedient) techniques of manufacture and reduction, typical of exploitation of low risk resources and a reliable supply of raw materials’.

## Regional patterns in site structure

Site structure describes the properties of size and density of contents. A consideration of regional patterning in site structure is critical to understanding the archaeological record of the southern Curtis Coast, where there is a variety of different site types of various dimensions. While area estimates are relatively straightforward for small or discrete sites (e.g. Seven Mile Creek Mound, Eurimbula Creek 1 and 2), they are less precise for very large sites (e.g. Eurimbula Site 1, Pancake Creek Site Complex). Although dense modern vegetation and restricted subsurface sampling limit confidence in estimates of site area and structure, a number of basic observations can be made.

Table 14.5 reveals a generally inverse relationship between site area and shell density (Figs 14.13–14.16). That is, when we exclude the very small, probably single occupation sites, Eurimbula Creek 1 and 2 from consideration (see Chapters 10 and 11), very large sites tend to have low shell densities and vice versa. For illustrative purposes, Table 14.5 shows a total estimated maximum shell content based on the shell density of shell-bearing excavated deposits and estimated site area. For example, although the Ironbark Site Complex has one of the lowest shell densities of any site (in terms of both g/kg and g/m<sup>2</sup>), it probably contains more shell than the Seven Mile Creek Mound, which exhibits the highest excavated shell density. These figures may overestimate or underestimate total shell content owing to sampling and a variety of other considerations. However, in general terms, site size can significantly distort consideration of the regional archaeological record because excavation sample size was not scaled to site area.

By extrapolation from excavated contexts to the whole site area, the vast majority of shell extant in the contemporary landscape can be demonstrated to date to the last 1,000 years. All of the shell at Tom’s Creek Site Complex, Ironbark Site Complex, Pancake Creek Site Complex and Eurimbula Creek 1 and 2 dates to the last millennium and the majority of shell at Eurimbula Site 1 dates to this period as well (Fig. 14.16). Clearly, the volume of cultural material deposited on the landscape is related to a change in site morphology from relatively small, discrete sites with high density remains in the early period, represented by the Seven Mile Creek Mound and Mort Creek Site Complex, to extensive sites characterised by low density cultural remains after 1,500 BP.

Table 14.5 Shell density characteristics of excavated sites arranged in descending order of total estimated shell content.

SITE	SITE AREA (m <sup>2</sup> )	AREA EXCAVATED (m <sup>2</sup> )	SHELL RECOVERED (g)	SHELL DENSITY (g/m <sup>2</sup> )	TOTAL ESTIMATED SHELL (kg)
ES1	100000	1.00	6667.27	6667.27	666727.24
TCSC	50000	1.50	16092.63	10728.42	536420.94
ISC	150000	1.00	903.46	903.46	135518.66
SMCM	200	0.25	135794.85	543179.39	108635.88
MCSC	2500	0.25	8748.79	34995.18	87487.95
PCSC	22500	2.00	6616.87	3308.43	74439.74
EC1	10	1.00	1330.22	1330.22	13.30
EC2	10	0.25	201.29	805.16	8.05

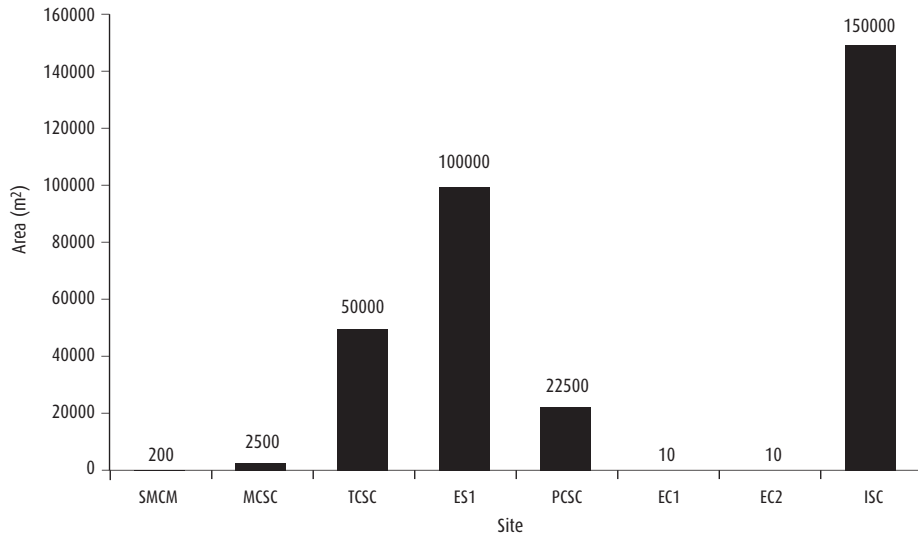


Figure 14.13 Estimated site area for excavated sites.

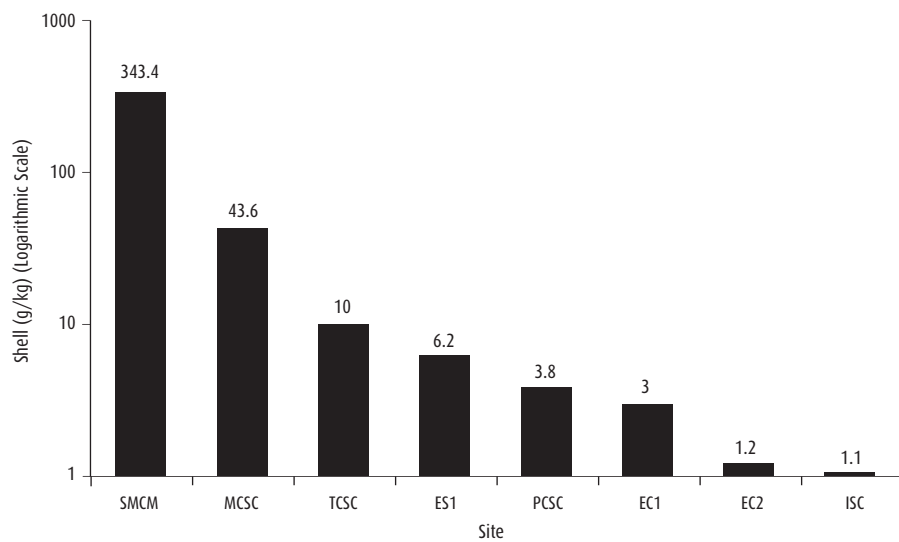


Figure 14.14 Shell density as a unit of weight of excavated deposit for excavated sites. Only shell-bearing squares are included in calculations. Note logarithmic scale.

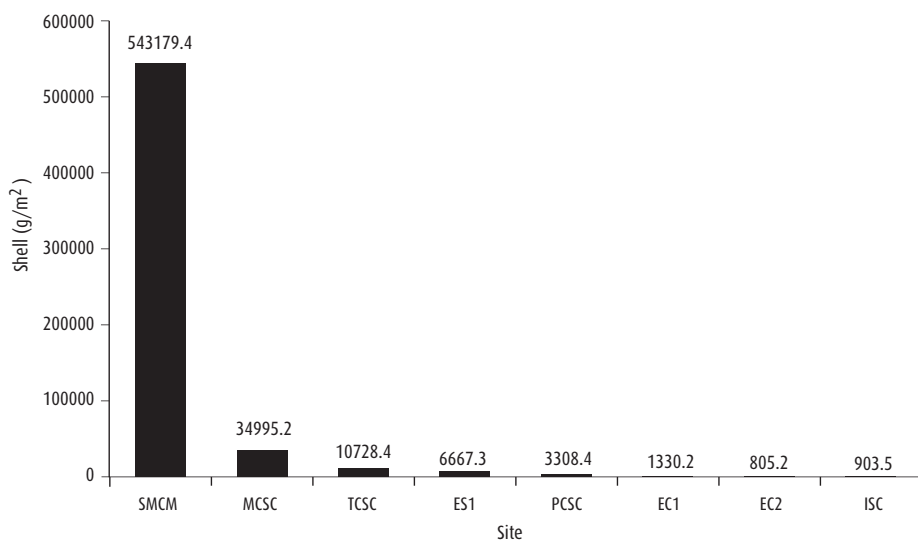


Figure 14.15 Shell density as a unit of area of excavated deposit.

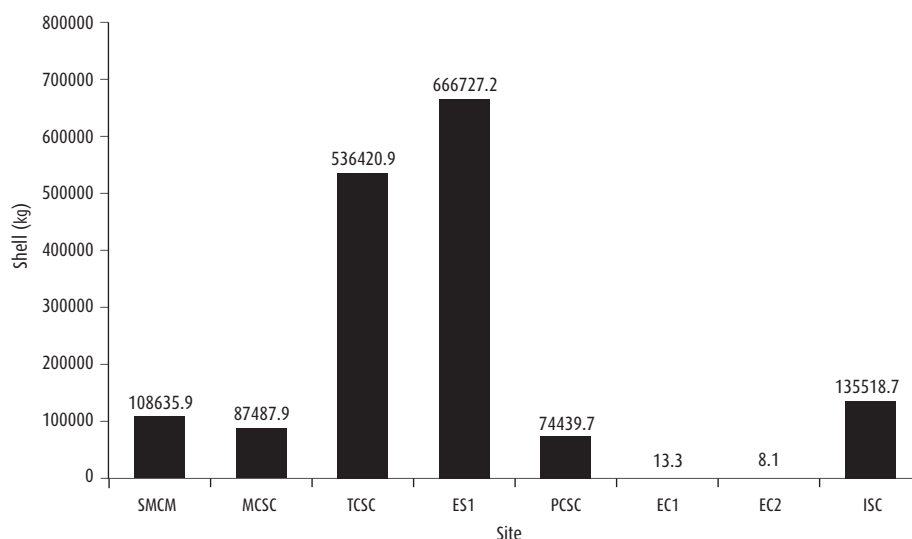


Figure 14.16 Extrapolated total site shell content based on site area and shell density.

## Discussion

Clear changes are documented in the archaeological record of the last 4,000 years on the southern Curtis Coast. Two of the three sites occupied before 1,500 BP were abandoned by around 2,000 BP. Deposition of cultural material across the region slowed dramatically shortly after 2,000 years ago and remained low until around 1,000 years ago. A period of regional abandonment is possible at this time, or, at the very least, a general period of reduced use of the coastal zone. It is only after 1,500 years ago that there is evidence for the beginnings of a land-use system that has obvious parallels to that documented in the recent archaeological record, ethnography and Aboriginal oral histories. This most recent phase is characterised by occupation at multiple locations across the coastal region and increasing discard of cultural materials (shell, fish bone, charcoal, stone artefacts) over the last 1,000 years. A distinction can thus be drawn between more persistent occupation post-dating 1,500 BP versus more intermittent use of the coastal zone before 1,500 years ago.

These general patterns cannot be explained in terms of differential site preservation. Archaeological deposits at Eurimbula Site 1, Pancake Creek Site Complex and Eurimbula Creek 2 are located towards the top of long stratified dune sequences which pre-date Aboriginal occupation by millennia. Mort Creek Site Complex and Seven Mile Creek Mound are located on stable landforms and were abandoned in antiquity with no evidence for erosion selectively removing more recent deposits. The situation is less clear at other sites. At Ironbark Site Complex, Tom's Creek Site Complex and Eurimbula Creek 1 at least some of the low dunes containing cultural material probably only date to a more recent phase of dune-building in the last 2,000 years. Elsewhere in Australia the preferential location of middens on or close to the present shoreline has been linked to poor survival potential and differential preservation of this site type (Fresløv and Frankel 1999). However, as argued elsewhere (see Chapter 2), the open coast does not appear to have been a focus of occupation on the southern Curtis Coast, with all major sites located on the protected shores of estuaries. While local landscape depositional and erosional regimes might have impacted on some site-specific assemblages (e.g. storm-surge events), the overall pattern is robust and cannot be explained simply in terms of differential preservation.

## Modelling regional settlement histories

The data presented above provide the basis of a descriptive model of regional settlement histories. At least three distinct patterns of land-use can be inferred from structural discontinuities in the regional archaeological record. These patterns can be usefully considered in terms of three phases of occupation:

- Phase I (pre-4,000 BP–1,500 BP)
- Phase II (c.1,500 BP–c.AD 1850s)
- Phase III (c.AD 1850s–c.AD 1920s)

### **Phase I (pre-4,000 BP–1,500 BP)**

Before 1,500 BP occupation of the southern Curtis Coast is geographically tightly-focussed, short-term and discontinuous. Only three sites in the region date to this period: Seven Mile Creek Mound, Mort Creek Site Complex and Eurimbula Site 1. Occupation of only one of these sites, Eurimbula Site 1, continues throughout the last 3,000 years, but even here the changes in site form, discard rates, stone artefact technologies and raw material representation point to changes in the use of the site over this interval.

Use of local raw materials is limited in Phase I and stone artefact assemblages are characterised by the use of highly siliceous stone, such as volcanic ash, silcrete and chert, which appears to have a non-local origin as no major extraction sites for these materials have been located in the study area. Artefacts manufactured on siliceous materials are heavily curated and there is little evidence for onsite reduction, lending support to the idea that most artefacts were manufactured elsewhere, transported into the region and curated for maximum use-life. This pattern is highlighted at Eurimbula Site 1, where deposits dating to before 1,500 BP contain curated artefacts manufactured on siliceous materials whereas the post-1,500 BP assemblage is overwhelmingly dominated by expedient artefacts manufactured on local materials.

Site form and content suggest short-term occupation targeting marine fish, gathering of shellfish (especially oyster and mud ark) and capture of large marine animals (dugong and turtle). Deposits at all three sites dating to this period are limited in extent. The Seven Mile Creek Mound is a discrete mound covering a maximum area of 200m<sup>2</sup>. Although uncertainty remains over the formation history of the Mort Creek Site Complex, cultural materials appear to be restricted largely to an area of less than 2,500m<sup>2</sup>. Although Eurimbula Site 1 has an area in excess of 100,000m<sup>2</sup>, deposits pre-dating 1,500 BP are restricted to a small area at the southern end of the site covering less than 2,500m<sup>2</sup>. Neither occupation nor abandonment of the Seven Mile Creek Mound and Mort Creek Site Complex is synchronous, supporting the impression of very low levels of use of the coast during the third and fourth millennia BP.

In the absence of permanent occupation of the coastal zone in Phase I, repeated occupation of certain sites may have been a deliberate strategy to demarcate social geography. For example, the shell mound at Seven Mile Creek and the stone monolith at Mort Creek are imposing landscape features. In particular, mound construction on the southern Curtis Coast represents patterns of landscape use which are fundamentally different from those adopted during subsequent periods, when no mounds occur. The geographically-focussed nature of isolated mound accumulation and the virtual absence of stone artefacts and charcoal in the deposits point to logistical mobility strategies targeting estuarine resources. This signature is not consistent with a pattern of widespread residence on the coast. Instead, following McNiven (1990a), the pattern appears to be one where coastal sites were firmly embedded into regional settlement systems with a subcoastal focus.

The structure of the Seven Mile Creek Mound is of particular interest. The relatively small size of the mound does not appear to offer any obvious practical advantages to its occupants, such

as relief from insects, or elevation in a water-logged area (Bailey 1999). On this basis, it is possible that the motivations for mound formation are linked more to social factors than resource availability. As Morrison (2003:5) noted, 'it is very likely that they [the mounds] had inherent symbolic values to the successive generations of people who built and used them'. In the case of the Seven Mile Creek Mound, it appears that the fish, crab and shellfish represented in the mound were consumed elsewhere and deliberately deposited to form the mound. This repeated set of secondary disposal behaviours occurred systematically over a period of around 300 years — patterning that suggests intergenerational transmission of 'ritualised' knowledge relating to mound-building. McNiven and Feldman (2003:171–2) noted that such 'fixed, marked places add to cultural land- or seascapes the dimension of biography, differential knowledge and power ... marked places and their associated rituals not only anchor people to the past, they also provide beacons for the future'. McNiven and Feldman's (2003:188) comments on dugong mound formation in Torres Strait are relevant:

Whether or not construction of a mound was the long-term deliberate intention of site-users is difficult to know. A mound could simply be the concomitant result of long-term tethering of multiple, ritual, discard events. A growing mound, however, signifies successful hunts (to supply building material), confidence in its functional efficacy and a commitment to continued use. As a mound gradually increased in size, so too would its ritual gravity, because of increasing spiritual, social and historical capital. Each contribution to the mound not only signifies a hunting ritual, but a successful hunt, a dugong, a community feast, sets of social relations and gendered power relations ... Even after construction ceased, the physicality of mounds would continue to remind observers ... that successful dugong hunting depended on successfully-negotiated spiritual and social relationships.

Similarly, the construction of a stone-walled tidal fishtrap at Mort Creek Site Complex associated with deposits pre-dating 2,000 BP can be seen as a type of place-marking. Although the labour investment associated with construction and maintenance of stone-walled tidal fishtraps has been shown to be much less than generally assumed (e.g. Stockton 1982), construction implies intimate knowledge of local hydrology and patterns of fish movement (O'Sullivan 2003). It also imprints a very tangible physical signature onto the landscape, which could be interpreted as place-marking. The evidence strongly indicates that while occupation during Phase I was ephemeral, it was also highly focussed, with systematic extraction of a range of resources from estuarine landscapes.

In summary, use of Phase I sites can be characterised as a coastal component of a geographically wide-ranging settlement-subsistence pattern. That is, the evidence suggests specialised but ephemeral use of the coast by groups occasionally utilising these resources as part of a diffuse and highly-mobile settlement strategy covering a broad area. Groups transported high quality siliceous stone into the area, rather than using local stone, and curated it by retouching artefacts extensively for maximum use-life. This phase is consistent with Hiscock's risk reduction model, in which the adoption of risk-minimising stone artefact technologies is linked to the need for higher mobility in unfamiliar or little-visited country (e.g. Hiscock 1994; McNiven 1994b). Also relevant is Binford's (1979) model of raw material procurement embedded in general land-use strategies, in this case extending over a wide catchment. These groups may have been based primarily around the predictable riverine resources in major catchments such as the Boyne Valley.

As always, caution needs to be exercised in interpreting data from early periods of occupation owing to reduced 'archaeological visibility' of settlement-subsistence strategies 'with low-level seasonal visitation or occupation of regions with unstable and rapidly eroding land surfaces' (Mulvaney and Kamminga 1999:179). Dortch et al. (1984) have also pointed out that low intensity shellfish gathering is unlikely to be represented in the archaeological record owing to the low probability of small shell scatters being preserved (see also Smith 1999). First evidence for

occupation of the region should not, therefore, necessarily be taken as indicating the antiquity of coastal settlement or use of the coast. Following the positions advanced by McNiven (1991a) and Hall and Hiscock (1988) and others, I argue that marine and estuarine resources would have always been a consistent and integral feature of broad-based Aboriginal coastal economies. Although access to coastal resources may have been difficult at periods of maximum sea-level fall, expanded river valleys across the continental shelf would have offered a range of resource zones, perhaps with no modern correlates. After rising sea-levels breached the continental rise and began to invade the continental shelf in the terminal Pleistocene/early Holocene there is no reason to suspect that coastal environments did not always provide a range of resources, which were exploited by people even if these resources were not identical to those available today.

### **Phase II (c.1,500 BP–c.AD 1850s)**

Phase II comprises (1) a diversification and localisation in resource use, evident in the appearance of extraction sites throughout the coastal zone and increased rates of site establishment and use and the increased use of local stone resources; (2) technological investments in processing technologies of plant resources; and (3) more intensive use of existing resources.

Post-1,500 BP use of the southern Curtis Coast appears to have been structured quite differently from that of Phase I. By 1,000 years ago sites appeared throughout the coastal zone, with very large linear sites on the lower margins of major estuaries. Occupation appears to have been unrelated to that at sites occupied before 1,500 years ago, with more frequent and/or more intensive occupation and sustained increases in deposition rates of cultural materials at most sites throughout Phase II. These later sites point to more systematic use of the coastal landscape. Although localised ecological changes, especially those impacting resource availability, could account for site- and estuary-specific patterns of occupation, the synchronicity of changes across the region suggests there were wider processes involved, implicating restructuring of pre-existing patterns of land-use. Archaeological signatures for a transition to increasingly low mobility and logistically-oriented subsistence systems are manifest in widespread regional occupation, increased deposition rates and changes in stone artefact technologies.

The Ironbark Site Complex quarry was heavily exploited for the first time as a major raw material source during Phase II. Although the quarry was used at least occasionally during Phase I, this later period of intensive stone extraction and reduction indicates a fundamental change in the role of the quarry in the pattern of regional land-use. Significantly, the peak in stone artefact discard identified at the quarry between around 1,500–1,000 BP is coeval with an overall reduction in regional occupation identified earlier in patterns of site creation and occupation, as well as in depressed shell and fish bone discard. No evidence for subsistence activities has been found at the Ironbark Site Complex dating to this early period. It appears that while the quarry was targeted for raw material extraction, there was very little use of surrounding coastal landscapes. This use of the quarry as a base for other activities therefore signals the origins of a new system of regional land-use. This pattern suggests that early stone extraction at the quarry was embedded in wider land-use strategies not centred on the coastal zone. This pattern is soon succeeded by the creation and occupation of multiple sites across the region, all of which contain rhyolitic tuff derived (probably exclusively) from the Ironbark Site Complex. While early intensive extraction dating to 1,500 BP may have been related to broad-based and wide-ranging land-use strategies, by 1,000 BP the presence of artefacts manufactured on rhyolitic tuff throughout the coastal zone indicates that use of the quarry is firmly embedded in more localised patterns of resource use. The increasing use of the quarry for artefact manufacture throughout the region signals a refocussing of land-use strategies on local raw materials which may be related to patterns of reduced mobility.

Localisation in the use of stone resources (rhyolitic tuff, microgranite and quartz) in Phase II is accompanied by a change from highly curated to expedient stone reduction strategies associated

with reduced mobility (Parry and Kelly 1987). Edge-ground hatchet manufacture on rhyolitic tuff also probably commences during this period, suggesting the possibility of a trade in high prestige items. The use and trade of the distinctively local rhyolitic tuff would also serve to differentiate the distinct identity of coastal groups under a fissioning model like that proposed by McNiven (1999). Significantly in this connection, artefacts manufactured on rhyolitic tuff have a restricted distribution, with expedient forms limited to the coast and curated edge-ground hatchets found up to 100km away, but still within the historically-documented general Gooreng Gooreng language area.

The large size of many Phase II sites, the similarity of their contents and their access to a variety of resource zones suggests a degree of stability in residential precincts on the lower margins of major estuaries. There are also numerous undated scatters of cultural material (stone artefacts and shell) throughout the region which can be chronologically assigned to this period, as widespread use of rhyolitic tuff only occurs after 1,500 BP in dated contexts. Most investigated sites are considered to be residential bases (after Binford 1980), with the exception of two temporary sites (Eurimbula Creek 1 and 2), which were probably associated with specific extraction activities (Binford's 1980:10 field camps and Meehan's 1988:179 dinner-time camps). The residential bases are frequently large and reflect a wide range of activities from food processing and consumption to stone reduction. The distribution of cultural material at large multiple-component sites dating to the last 1,500 years such as Eurimbula Site 1, Ironbark Site Complex, Pancake Creek Site Complex and Tom's Creek Site Complex indicates tightly-focussed settlement strategies in a linear pattern parallel to creek margins, suggesting a pattern of relatively low mobility settlement. The spatial structure of the regional archaeological record reflects largely logistically-organised mobility strategies where large site complexes on the lower margins of major estuaries acted as nodal points in the landscape from which a variety of activities — including specialised exploitation of local microenvironments as represented by small activity-focussed sites — were undertaken, and resources returned to central base camps.

In sum, the features of Phase II are identified by Fresløv and Frankel (1999) as attributes of higher populations, reduced mobility and relative increases in resource use. By 1,000 BP a coastal economy (*sensu* Gaughwin and Fullagar 1995) appears to be firmly in place with evidence for broad-ranging use of the coastal margin and immediate hinterland, implying permanent and structured sedentary mobility strategies throughout the coastal zone. The manufacture and movement of edge-ground hatchets manufactured on rhyolitic tuff beyond the immediate area during this period also hints at the presence of established alliance networks and structures of regional social integration. The broad long-term trend is towards cumulative increases in use of the coastal landscape.

### **Phase III (c.AD 1850s–c.AD 1920s)**

Phase III is defined by the use and discard of artefacts manufactured on European raw materials at long-term occupation sites, demonstrating historical continuities in Aboriginal use of the landscape in the face of European occupation. Colonial impact, notably in the form of frontier violence and introduced diseases, precipitated demographic collapse of local Aboriginal social groups and virtual abandonment of the near-coastal landscapes by the mid-1850s (see Chapter 2). In the main, late nineteenth century Aboriginal populations in the region coalesced into fringe camps at major European townships such as Miriam Vale in the west and Gladstone in the north, or attached themselves to cattle stations established on their traditional lands (Williams 1981). Aboriginal land-owning groups appear to have aggregated along kin-related lines, with Roth (1898) recording a long-term camp at Miriam Vale which comprised people from different local groups across the region. Although Aboriginal people occasionally visited the area after the 1920s from local Aboriginal population centres such as Berajondo and Gladstone, the entire region was

effectively depopulated by the removal of Aboriginal people to reserves and missions under the provisions of the *Aboriginal Protection and Restriction on the Sale of Opium Act 1897* (Williams 1981).

Despite disappearing from the European historical record, Aboriginal people continue to use traditional camping places well into the period of European occupation. Flaked bottle glass at both the Ironbark Site Complex and Tom's Creek Site Complex consists of thick bottle bases dating to AD 1890s–AD 1910s. Masses of starch grains and woody tissues observed on several of the artefacts suggest woodworking and plant processing activities, including toxic plant preparation. Contemporary Aboriginal oral histories provide a general historical context for these finds, with Aboriginal families continuing to visit the area from bases at local cattle stations in the early AD 1900s. The location of both sites is far from European settlement of the era. Transportation and use of glass as a medium for artefact manufacture may indicate the presence of small, highly-mobile groups.

The presence of post-contact use of long-term occupation sites points to the persistence of traditional knowledge and continuity of site use. Flaked glass implements dating to the early twentieth century invoke the resilience and hybridity of traditional stone-working technologies in the face of massive social dislocation. The continuing use of these particular locations on the landscape in Phase III provides another line of evidence to determine the antiquity of the recent structure of land-use. The fact that two sites first occupied around 1,500 years ago are targeted for use in the post-contact period is not simply fortuitous, but rather points to a persistence of knowledge of the location of these places on the landscape.

The evidence for post-contact use of these sites coincides with the post-AD 1897 restrictions on the movement of Aboriginal people in Queensland, including forcible removal, suggesting at least three possibilities: use of the sites as resistance and avoidance of European control; use of the sites to fulfill traditional responsibilities; and deliberate surveillance of European activities. A possible fourth phase may be defined as the period from the 1920s to the present, in which Aboriginal people have sought to re-establish connections to country through a range of activities, including residence, camping, fishing, festivals and conducting cultural heritage impact assessments. However, further consideration of this period is beyond the scope of this study.

## Summary

A synthesis of archaeological data concerning Aboriginal occupation of the southern Curtis Coast demonstrates initial occupation around 4,000 BP, a major disjunction between c.2,000–1,500 BP and continuous patterns of regional land-use from 1,500 BP into the early twentieth century. The recent trajectory towards localisation of resource use and permanent settlement of the coast can be related to a long-term trajectory of demographic change and social restructuring. Before the late Holocene populations appear to be highly-mobile and wide-ranging, with evidence for only occasional foraging expeditions from subcoastal base camps. After 1,500 BP the coast assumed an even more important role in regional mobility strategies, culminating in permanent occupation from c.1,500 BP. From this time, excavations and analysis document widespread transitions in the archaeological record of the region occurring over relatively short-term periods encompassing increased rates of site establishment and use, localisation in stone raw material sourcing and discard of cultural materials, which together point to relatively more intensive forms of landscape use than previous periods.