THE ARCHAEOLOGY OF THE SOUTHERN CURTIS COAST: AN OVERVIEW

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Since 1993 archaeological surveys and excavations have been undertaken on the southern Curtis Coast as the coastal component of the Gooreng Gooreng Cultural Heritage Project. This paper briefly outlines the physical environment of the study region including geology, vegetation and fauna communities before presenting the preliminary results of archaeological surveys and excavations. These initial results suggest that the region has an extensive mid-to-late Holocene archaeological record that has the potential to contribute to understandings of changes in late Holocene Aboriginal societies in Central Queensland.

Introduction

The southern Curtis Coast area was selected as a coastal focus for Gooreng Gooreng Cultural Heritage Project preliminary archaeological investigations for five main reasons: (1) previous studies (Burke 1993; Godwin 1990; Rowland 1987) had indicated the considerable archaeological potential of the region; (2) the region included a variety of coastal zones such as open beaches, estuaries and embayments not typical of the coast to the immediate south or north; (3) until recently the region has not been subject to any major coastal landscape-altering development, suggesting the probability of low-level site disturbance; (4) the area includes a high concentration of National Parks and other protected areas facilitating access; and, (5) the general region is recognised as a prime area for heavy industrial, residential and tourist growth where cultural heritage data are urgently required for the development of effective management plans (Lilley and Ulm 1995).

Physical Setting

The southern Curtis Coast study area is located on the central coast of Queensland, just south of the Tropic of Capricorn. The study area extends from Wreck Rock in the Deepwater Section of Eurimbula National Park in the south to Richards Point in the Rodds Peninsula Section of Eurimbula National Park in the north and from the coast to Miriam Vale and Seven Mile Creek in the west (Figure 1). The study region covers a total land area of about 1,200km^2, with a high water level shoreline length of approximately 450km. The study area is located c.70km northwest of Bundaberg and c.20km southeast of Gladstone, between latitudes 24°20' and 23°58' south and longitudes 151°30' and 151°57' east.

Geology and Geomorphology

The southern Curtis Coast comprises a relatively restricted range of rock types and landforms dating from the Triassic period of more than 160 million years ago, to the very much more recent estaurine and beach ridge deposits dating to the last 6,000 years (QDEH 1994:33). The basal geology of all but the extreme west of the study area is dominated by rhyolites and granites assigned to the Agnes Water Volcanics formation of the Toogoolawah Group dating to 235-213 million years ago (Ellis and Whitaker 1976; Stevens 1968). Bustard Head and Rodds Peninsula are composed of unnamed granites of Triassic age. Although the region is punctuated by rocky headlands, the study area is characterised as a depositional coastline with low north-northwest trending Holocene beach ridges and swales oriented roughly parallel to the modern coastline, trailing northwards from the northern side of almost every estuary of note (Hopley 1985:76-77). Beach ridges and sand masses consist of fine-grained quartz sands and dispersed heavy mineral sands including rutile, ilmenite and zircon (Connah 1961).

The coast in the study area is open to full oceanic conditions, which has significantly impacted upon coastal sedimentation and erosion regimes. This situation is relatively unusual on the Queensland coast, as to the south (with the exception of Cooloola) the mainland coast is protected by Fraser, Moreton, and North and South Stradbroke Islands, and to the north by the Great Barrier Reef.

One of the primary issues in evaluating the regional archaeological record is consideration of palaeoenvironmental factors, particularly the potential effects of sea-level change and erosion on site survival and visibility. Accumulating geomorphological evidence suggests that there may have been minor variations in sea-level along the eastern Australian coast since 6,000 BP. Larcombe *et al.* (1995) have recently presented a model of episodic post-glacial sea-level rise based on a detailed study of radiocarbon dates from the central Great Barrier Reef shelf (between Hayman Island and Cape Tribulation) for the last c.12,000 years. On this basis, they identify a peak in sea-level at c.8,500 BP at

c.–11m, a regression at c.8,200 BP at –17m, followed by a rapid rise to c.–5m at c.7,800 BP. Sea-level remained relatively stable until c.6,800 BP before a rise to a short stillstand at –2m at c.6,000 BP and then to the Holocene stillstand of +1.65m at c.5,500 BP until c.3,700 BP, when sea-levels dropped to approximately modern values. This model contrasts with earlier sea-level curves for northeastern Australia, which have suggested stabilization at current levels at 6,000 ± 500 BP (e.g. Belperio 1979; Hopley 1983; Lambeck and Nakada 1990; Thom and Roy 1983).

This model of sea-level change has significant ramifications for understanding the archaeology of the study area, as much of the land within 2km of the present coastline exhibits very low elevation, interspersed with large freshwater swamps and wetlands and extensive estuarine systems. Field surveys and examination of aerial photographs revealed a regular system of parallel transgressive beach ridges extending over much of the study area (particularly between Round Hill and Falls Creeks), suggesting major transformations of the coastal landscape over time. The assignment of the majority of these changes to the late Holocene is supported by a preliminary series of four radiocarbon dates from a pollen core taken from freshwater wetlands adjoining Round Hill Creek (on the inland side of a major series of transgressive beach ridges), suggesting a basal date for swamp formation of c.3,000 years ago, consistent with recent arguments for sea-level retreat (M. Cotter, Centre for Coastal Management, Southern Cross University, pers. comm., 1999).

Taken together, this evidence suggests a very recent origin for many of the coastal landforms which are the subject of this study, including numerous tidal estuaries, extensive inter-tidal and sub-tidal mudflats, low sandy beach ridges and cheniers (Figures 2-6).

Climate

The region has a sub-tropical, maritime climate influenced by the southeast trade winds, regional topography and the moderating influences of the ocean. The region experiences occasional monsoon influences, although cyclones are more frequent features, as are the major frontal systems common in more southerly latitudes. These varied influences generate marked variability in rainfall, temperature and prevailing wind conditions on the Curtis Coast (QDEH 1994:11).

The average maximum and minimum temperatures in the region range from 28.9°C and 22.8°C respectively in the summer to 20.9°C and 13.4°C respectively in the winter (QDEH 1994:13). Regional rainfall is summer-dominated, with January and February commonly the wettest months and August and September the driest, with mean annual rainfall at the Town of Seventeen Seventy of 1,318mm (QDEH 1994:11). Major factors which influence the distribution of rainfall include topographic influences of mountain ranges, geographic influences such as the orientation of the coastline to the prevailing water-saturated winds, and occasional cyclones causing extreme rain events from November to April.

Hydrology

The Curtis Coast is transected by numerous creeks and rivers which form an extensive network of interconnected estuaries. Numerous minor seasonal tributaries drain into estuarine creeks from the low sub-coastal ranges in the west. The Munro Range, Edinburgh Mountains and Westwood Range divide the catchments of Baffle, Round Hill, Eurimbula and Middle Creeks to the south and east from Worthington and Seven Mile Creeks to the north (Olsen 1980a:4). The major influences on water movement within these tributaries are prevailing tides and weather conditions, although freshwater inflow associated with periods of high intensity rainfall can cause heavy runoff, which produces short-term fluctuations in estuary salinity and turbidity (Olsen 1980a:5). Olsen (1980a:6) notes that tidal flushing of estuaries is generally high, except for a period of depressed salinity between January and March suggesting significant terrestrial freshwater rainfall input (see also Lupton and Heidenreich 1996 for similar data for Baffle Creek).

In the south, Round Hill, Eurimbula, Middle and Pancake Creeks are generally shallow, mangrove-fringed estuaries characterised by sandy bottoms merging to silt and clay in the upper reaches (Olsen 1980a:3). To the north, Rodds Harbour and Seven Mile Creek exhibit deeper channels near the mouth and extensive flats and zones of silty sand upstream with large areas of mangroves with clay pans bordering grassy or layered eucalypt forest (Olsen 1980a:3).

Tidal processes of the Curtis Coast are influenced by the presence of the southern extremities of the Great Barrier Reef, ocean floor topography and coastal geology, such as inshore islands and headlands (QDEH 1994:17). The tidal effects of estuaries also contribute to the amplification of tidal range along the Curtis Coast, with an average maximum tidal range of 2.43m at Pancake Creek in the approximate centre of the study region (QDOT 1998). Like all coastal regions, the area is subject to both wind- and storm-generated waves which modify the configuration of the shoreline. Unfortunately, only scant research into coastal erosion processes has been undertaken in the area and the effects of erosion on the representation of archaeological materials in

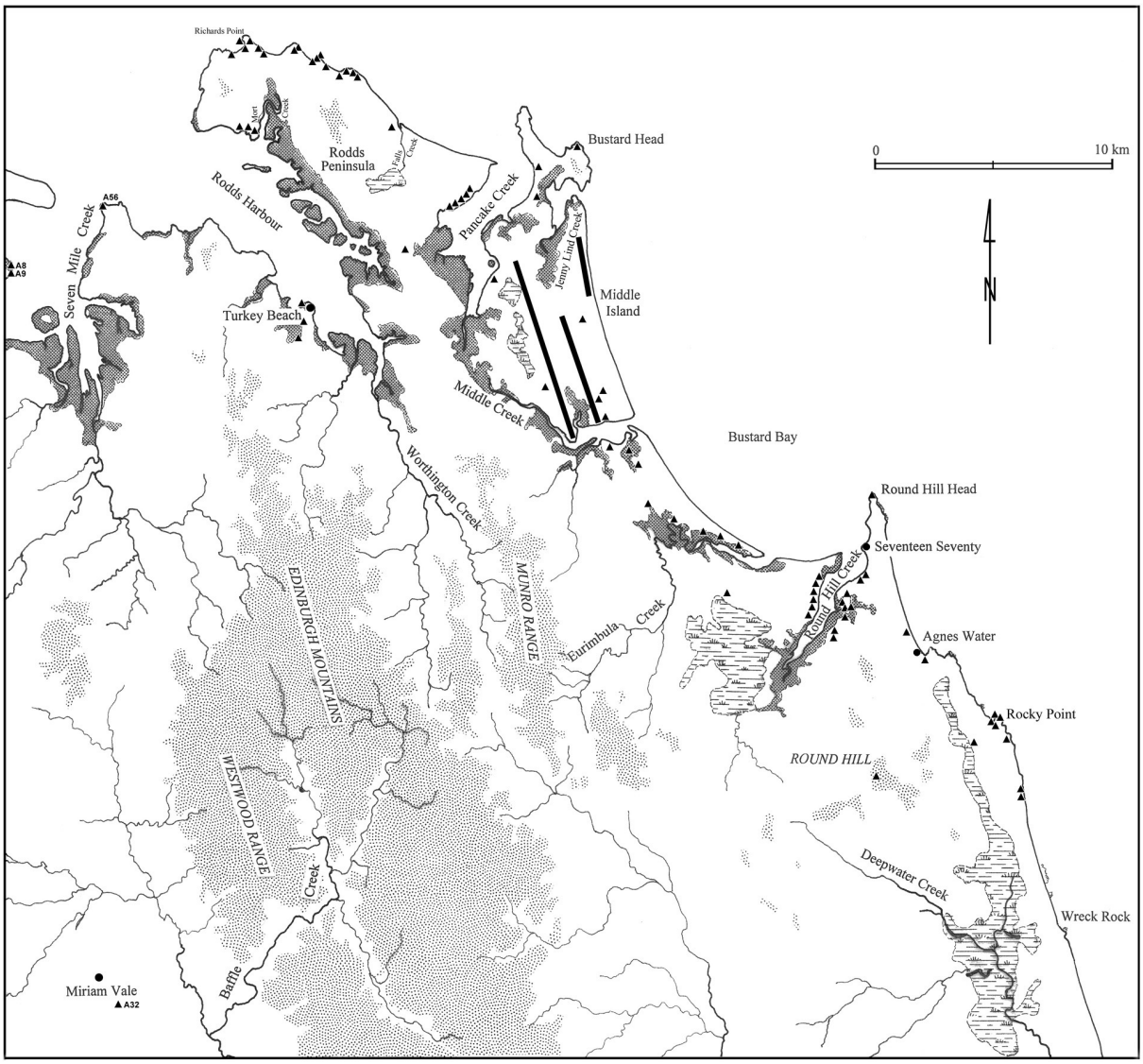

Figure 1. The southern Curtis Coast study area, showing all recorded archaeological sites as triangles (after Burke 1993; Davies 1994; Lilley 1994; Lilley *et al.* 1997; Neal 1986; Rowland 1987; Ulm 1999). Site designations are shown for sites which are not illustrated in Figures 8-9. These sites are listed in Appendix A with the prefix 'KE:'.

open beach contexts is difficult to assess. Anecdotal evidence and field observations suggest that storm-surge activity exacerbates local erosion (Figure 7).

Vegetation

The ecological complexity and diversity of the study region reflects its status as part of a transitional zone between tropical and temperate provinces, with a zoo-geographical boundary identified at about latitude 25° south (Endean *et al.* 1956; Knox 1963). This overlap generally translates into high rates of floral and faunal diversity, with representation of both tropical and temperate species. The region supports an extensive range of herblands, grasslands, heaths, scrubs and tall shrublands, and open and closed forests (QDEH 1994:45). Mixed herblands on foredunes include *Ipomoea pes-caprae* and *Canavalia rosea*. Extensive wet and dry heathlands occur on poorly-drained sandy-loam soils, comprising a number of species generally less than 2m in height, including banksia (*Banksia* sp.), paperbark (*Melaleuca* sp.), and grass trees (*Xanthorrhoea* sp.). Beach ridges support tall open paperbark forests, dominated by the species *Melaleuca leucadendra* and *M. dealbata* in association with cabbage-tree palm communities (*Livistona australis*) (QDEH 1994:48). The distribution of closed forest is limited, with a relatively restricted tall, araucarian closed-forest community found bordering Eurimbula Creek, with hoop pine *Araucaria cunninghamii* emergent above a notophyll vine forest (QDEH 1994:49).

Estuary systems exhibit extensive fringing vegetation communities consisting of combinations of some 13 mangrove species dominated by the grey mangrove (*Avicennia marina*), red mangrove (*Rhizophora stylosa*) and yellow mangrove (*Ceriops tagal*) (Dowling 1980; Olsen 1980a). Seagrass beds (dominated by *Zostera capricornia*) are typically found in sheltered waters where water clarity allows sufficient light penetration for photosynthesis, including Round Hill Creek, Rodds Harbour, Pancake Creek and Mort Creek (Olsen 1980b; QDEH 1994). These habitats provide important breeding and feeding grounds for prawns, crabs and fish as well as turtles, dugongs and numerous water fowl.

Fauna

The region's terrestrial fauna is diverse and includes 60 species of mammals (including bats, echidna, koala and kangaroos), 59 species of reptiles (including lizards and snakes) and 288 bird species (including shorebirds, waterbirds, seabirds and birds of prey) (QDEH 1994:59-65). Macropods include the eastern grey kangaroo (*Macropus giganteus*), whiptail wallaby (*M. parryi*) and swamp wallaby (*Wallabia bicolor*). Occasional dingoes (*Canis familiaris*) have also been sighted in remote parts of the study region. Bird species common to these habitats include the beach thick-knee (*Esacus magnirostris*) and eastern curlew (*Numenius madagascariensis*). The terrestrial environment has been impacted by intensive logging of local areas and long-term grazing of cattle. At least one local extinction is apparent, that of the eastern bustard or plain turkey (*Choriotis australis*) (Growcott and Taylor 1996:25).

Common marine fauna found along the Curtis Coast include a number of whale species (including the humpback *Megaptera novaeangliae*), four species of dolphin, dugongs (*Dugong dugong*) and turtles (including loggerhead *Carreta caretta* and green *Chelonia mydas*). Rodds Harbour supports the largest dugong population along the Curtis Coast (QDEH 1994:66). As a transition zone, the area is also a wintering destination for some whales and migratory waterbirds.

A total of 148 species of fishes from 69 families is recorded for the Curtis Coast (QDEH 1994:68). A detailed study of the lower estuarine sections of Baffle Creek just to the south of the study area conducted in 1993-1994 by Lupton and Heidenreich (1996) provides useful data. The lower estuarine component of this fisheries resource assessment covered habitats similar to the coastal estuaries in the study area. Despite significantly depressed regional rainfall levels (25% under the annual average) before and during the survey period, 55 fish and nine crustacean species were recorded. The larger fish species were dominated (in order of abundance) by flat-tail mullet (*Liza dussumieri*), sand mullet (*Myxus elongatus*), whiting (*Sillago ciliata*, *S. maculata* and *S. sihama*), bream (*Acanthopagrus australis*), blue-tail mullet (*Valamugil seheli*), sea mullet (*Mugil cephalus*) and garfish (including *Arrhamphus sclerolepis* and *Hyporhamphus ardelio*) (Grant 1993; Lupton and Heindenreich 1996). Commercial finfish catches for the region similarly reflect this pattern, with mullet, whiting and bream accounting for 64.1% of commercial catches (Olsen 1980a:11). Mud crabs (*Scylla serrata*) and sand crabs (*Portunus pelagicus*) are also common.

The contemporary estuarine molluscan fauna along the southern Curtis Coast is dominated by commercial oyster (*Saccostrea commercialis*), found in mangrove and rocky habitats, and gastropods such as hercules club shell (*Pyrazus ebeninus*), and members of the family Potamididae, including the mud creepers *Telescopium telescopium* and *Terebralia sulcata* (Roughley 1928; Shanco and Timmins 1975). Midden deposits are dominated by commercial oyster and the mud ark *Anadara trapezia*, an estuarine bivalve, although this species is very

Figure 2. General view of Bustard Bay, showing the mouth of Jenny Lind Creek in foreground, facing southeast (Photograph: S. Ulm).

Figure 3. Chenier ridge on Rodds Peninsula extending into Rodds Harbour, facing southwest (Photograph: I. Lilley).

Figure 4. High sandmass on northeast Middle Island, showing Bustard Head in background, facing north (Photograph: S. Ulm).

Figure 5. Freshwater wetlands adjoining the upper reaches of Round Hill Creek, facing north (Photograph: S. Ulm).

Figure 6. General view of estuary systems and near-coastal ranges across Jenny Lind Creek, facing southwest (Photograph: S. Ulm).

Figure 7. Creek bank erosion, north bank of Middle creek, facing northwest (Photograph: S. Ulm).

sparse in the coastal waters of Queensland today (Chappell and Grindrod 1984:222) and is not included in estuarine inventories for the region (Shanco and Timmins 1975). Contemporary open coast molluscs are relatively depauperate, with scattered populations of milky oyster (*Saccostrea amassa*) on exposed rocky headlands (Olsen 1980a:11,13) and pipi (*Donax deltoides*) on stretches of sandy coast.

Cultural Setting

The ethnohistoric record for the Curtis Coast is generally very sparse, with considerable conflict both among documentary sources and between documentary and Aboriginal oral histories (see Clarkson *et al.* in prep for a detailed discussion). In one of the earliest discussions of Aboriginal lifeways in this area, Curr (1887:122, 126) used the term 'Maroonee' to describe the people occupying the coastal areas of Rodds and Bustard Bays and inland to the Many Peaks Range. Mathew (1914) also placed 'Meerooni' in this area. Brasch (1975) suggested that a dialect of Gooreng Gooreng labelled 'Guweng' occurred in this same geographical area. Tindale (1974) termed this group 'Goeng' (also listing Meerooni, Gurang Gurang and Yungkong), and suggested it covered an area from Miriam Vale and south to the mouth of Baffle Creek. Significantly, Williams (1981:62) was not certain about including the area fringing Bustard Bay within Gooreng Gooreng country, despite extensive interviews with Aboriginal people from the study area. Clarkson *et al.* (in prep.) suggest that as the various terms refer to country today identified with Gooreng Gooreng speakers (see also Curr's 1887 language list for the Meerooni of Baffle Creek where 'no'= 'Gooraong'), they are unlikely to refer to the name of a language *per se*, but may be that of a dialect group or sub-group of Gooreng Gooreng (Burke 1993:8). In contemporary discourses, the study area is considered to be broadly part of the country of Gooreng Gooreng people (Clarkson *et al.* in prep.).

The very few documentary sources which relate to the immediate southern Curtis Coast study area span from Bank's observation on 23 May 1770 of two Aboriginal men walking along the beach just south of Bustard Bay (Beaglehole 1963:65). The following day, a party from the *Endeavour* went ashore at Bustard Bay to inspect the country, noting "innumerable Oysters, Hammer oysters and many more sorts" and a recently-vacated occupation site:

> Those who stayd on board the ship saw about 20 of the natives, who came down abreast of the ship and stood upon the beach for some time looking at her, after which they went into the woods; we on shore saw none. Many large fires were made at a distance from us where probably the people were. One small one was in our neighbourhood, to this we went; it was burning when we came to it, but the people were gone; near it was left several vessels of bark which we conceivd were intended for water buckets, several shells and fish bones, the remainder I suppose of their last meal. Near the fires, for there were 6 or 7 small ones, were as many peices of soft bark of about the length and breadth of a man: these we supposd to be their beds: on the windward side of the fires was a small shade about a foot high made of bark likewise. The whole was in a thicket of close trees, defended by them from the wind; whether it was realy or not the place of their abode we can only guess. We saw no signs of a house or any thing like the ruins of an old one, and from the ground being much trod we concluded that they had for some time remaind in that place (Beaglehole 1963:67).

Other members of the landing party also reported the tail of a land animal at the camp to those that remained on the ship (Pickersgill in Bladen 1892:218).

Subsequent sources (mainly from ships and exploratory vessels) make passing references to sightings of Aboriginal people, material culture or smoke from campfires in the general region (e.g. Flinders 1814; Oxley 1825). Flinders (1814:15-16) in August 1802 noted bark canoes, turtle remains and scoop nets at the southern end of Curtis Island to the north. In 1846, MacGillivray (1852:57) made the following observations while visiting Port Curtis:

> During our stay at Port Curtis, we had no intercourse whatever with the natives, although anxious to establish friendly communication. With the aid of the spyglass, we could occasionally make out a few, chiefly women, collecting shell-fish on the mud flats of the main land, and their fires were daily seen in every direction.

Although there have been suggestions of patterns of coastal transhumance related to water shortages (e.g. Oxley 1825), early historical sources document the presence of Aboriginal populations on the coast throughout the year (Burke 1993; Clarkson *et al.* in prep.) and permanent water stored in coastal sandmasses appears to have been perennially available (Buchanan 1999).

The most recent ethnohistoric documentary account for the immediate study area is from October 1846, when Colonel George Barney on board the *Cornubia* encountered Aborigines close to their camp while searching the southern entrance of Bustard Bay for freshwater with which to fill the ship's casks. Barney was shown a small freshwater soak in dense scrub about 100m from the base of Round Hill Head (McDonald 1988:10).

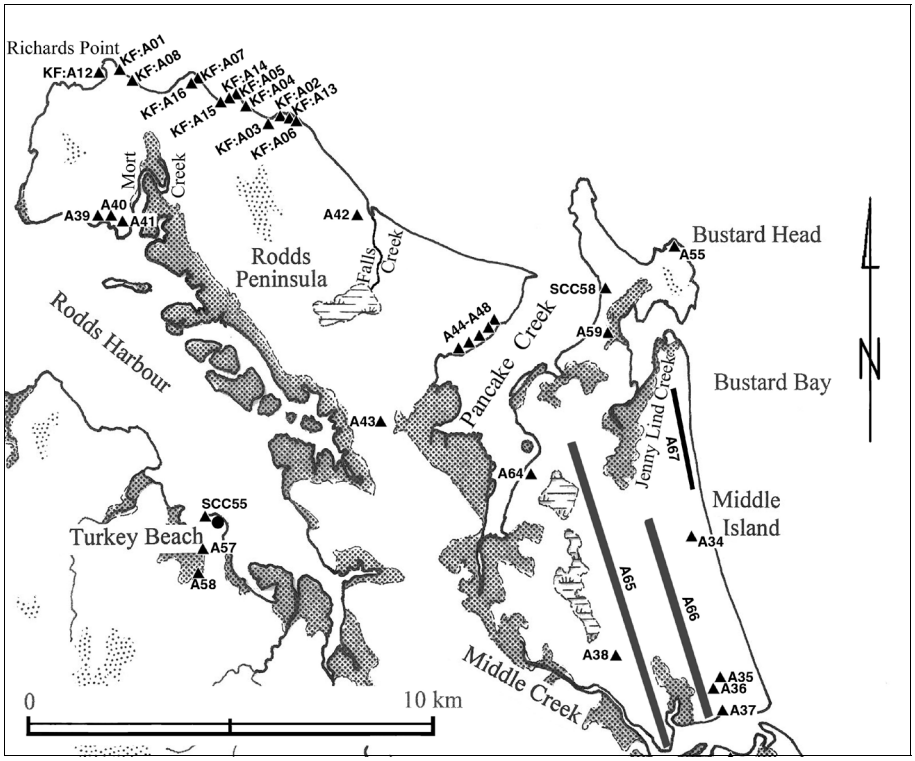

Figure 8. Northern segment of the study area showing recorded sites as triangles in the Middle Island, Rodds Peninsula and Turkey Beach areas (after Burke 1993; Lilley 1994; Lilley *et al.* 1997; Ulm 1999). Sites without a 'KF:' prefix are listed in Appendix A with the prefix 'KE:'. Sites listed with a 'SCC' prefix are currently unregistered sites.

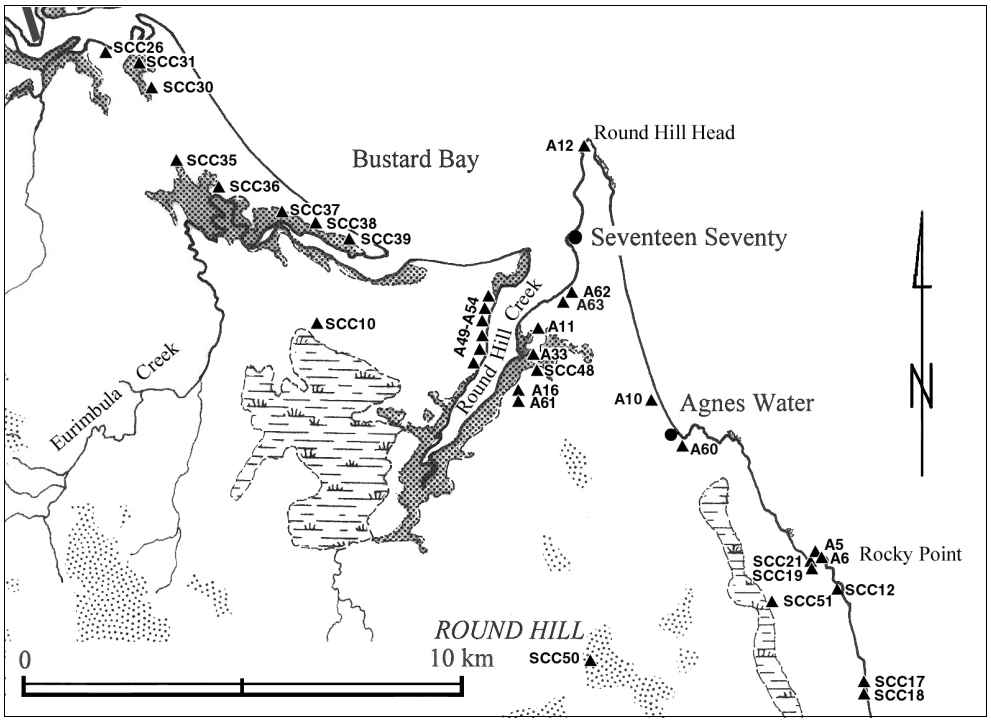

Figure 9. Southern segment of the study area showing recorded sites as triangles in the Agnes Water, Round Hill Creek and Eurimbula Creek areas (after Burke 1993; Lilley *et al.* 1997; Rowland 1987; Ulm 1999). Sites are listed in Appendix A with the prefix 'KE:'. Sites listed with a 'SCC' prefix are currently unregistered sites.

Colonial impact, notably in the form of frontier violence and introduced diseases, precipitated the demographic collapse of local Aboriginal social groups and virtual abandonment of the near-coastal landscape by the late nineteenth-century. For the Tooloola of the Gladstone area to the immediate north, Curr (1887) estimated that by 1882 a pre-European population of 700 had been reduced to 43. During the 1850s, the Native Mounted Police were active in the region and several massacres are known to have occurred in the Miriam Vale area (Clarkson *et al.* in prep). In the main, by the 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 (e.g. Roth 1898). Although Aboriginal people may have 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 (particularly Barambah, Woorabinda and Bogimbah) under the provisions of the *Aborigines Protection and Restriction of the Sale of Opium Act 1897* (Blake 1991; Evans 1991).

Archaeological Surveys and Excavations

Previous Research

Prior to the 1990s, knowledge of the archaeological record of the study region was extremely limited. In fact, prior to 1993 only eight sites were recorded on the Queensland Environmental Protection Agency site index for the study area. In 1978, a quarry site and axe grinding grooves were recorded on the coast just south of Agnes Water and in 1986 two shell middens were recorded by Neal (1986) on the west bank of Seven Mile Creek as part of an environmental impact assessment. Also in 1986, Rowland (1987) conducted a "broad cursory investigation" of the study area as part of general surveys of the coast between Elliott Heads and Turkey Beach. Rowland (1987:17) noted that "substantial middens are rare", sites are located "either atop rocky headlands or in sheltered estuaries", and that "smaller scatters of shells are located along open beaches". He (1987:17) concluded that:

> Whether this is a true reflection of Aboriginal settlement patterns in the area or an expression of geomorphological factors affecting preservation and visibility is a problem still to be resolved. Certainly the extent of erosion along the open coastal dune systems of the area would suggest that the loss of sites may be an important factor affecting the above pattern.

Godwin (1990) located an extensive midden on the west bank of Round Hill Creek during limited surveys of Eurimbula National Park (later registered as KE:A49-KE:A54). In 1993, Burke (1993) conducted selective systematic archaeological surveys in the region as part of a broad cultural heritage assessment between Agnes Water in the south and Raglan Creek in the north and up to 1km inland from the mainland coast. In the southern Curtis Coast study area, Burke (1993) documented 93 sites, including shell middens (n=77), stone artefact scatters (n=12), quarries (n=2), stone-walled fishtraps (n=1) and scarred trees (n=1). Overall, Burke (1993) found that sites were most commonly located on level or gently inclined sand dune surfaces in low-energy estuarine environments.

Gooreng Gooreng Cultural Heritage Project

Archaeological investigations conducted under the auspices of the Gooreng Gooreng Cultural Heritage Project commenced on the southern Curtis Coast in 1993, augmented by a number of cultural heritage impact studies undertaken by the authors (Lilley 1994, 1995). Together these investigations were designed to expand the results of earlier, more limited or project-specific surveys discussed above. Of particular interest were questions concerning the antiquity of human occupation in the coastal region and whether the concentration of sites in estuaries and near absence of material on ocean beaches noted by Rowland (1987) reflected past Aboriginal behaviour, recent geological processes or patterns of archaeological research. Up to the end of 1997, a total of 56 days of fieldwork (survey and excavation) had been undertaken on the southern Curtis Coast.

On the coast, systematic site surveys undertaken as transects were conducted in all major environmental zones including open beaches and rocky headlands, marine estuary systems, swamp and wetland margins, and the coastal ranges. To date, however, the majority of investigations have focused on near-coastal landscapes. The entire open coastline between Wreck Rock and Richards Point has been systematically surveyed as have the lower estuarine margins of Round Hill, Eurimbula, Middle, Jenny Lind, Pancake, Falls and Mort Creeks (Figure 1). Inland areas have proven more difficult to access owing to restricted access to freehold land, a lack of visibility and an absence of access tracks in many areas. The whole of Middle Island was intensively surveyed by Lilley (1994) using a grid of drilling-lines graded across the island for mineral sand exploration. Some small transects have also been undertaken on the northeast margin of a large swamp which dominates the western half of the Deepwater Section of Eurimbula National Park and parts of Round Hill National Park. Poor visibility away from coast and estuary margins is considered to be a major impediment to site detection (see also Burke 1993:23, 32-33).

Figure 10. Mud ark (*Anadara trapezia*) scatter at the base of a low erosion bank, site KE:A33, facing south (Photograph: S. Ulm).

Figure 11. Pipi (*Donax deltoides*) scatter on an open sandmass, site KE:A67, facing north (Photograph: S. Ulm).

Figure 12. Stone-walled tidal fishtrap, Mort Creek, site KE:A41, facing north (Photograph: T. Eales).

Figure 13. Stone-walled tidal fishtrap, Richards Point, site KF:A12, facing north (Photograph: I. Lilley).

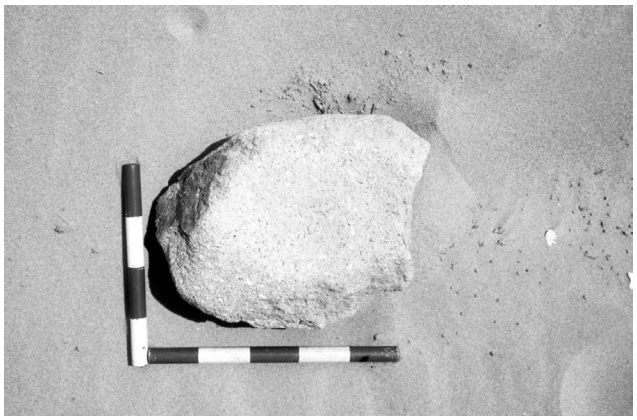

Figure 14. Microgranite grinding implement on an open sandmass, site KE:A67, facing south (Photograph: S. Ulm).

Figure 15. Retouched glass artefact in the fork of a quinine tree, site KE:A33, facing north (Photograph: S. Ulm).

Survey crews were deployed so as to sample most effectively the different micro-environments that were encountered. The usual strategy involved walking through the subject area in line-abreast at one visual distance separation between walkers and up to 50m in total width, focusing on areas of high ground-surface visibility. In some areas, the crew was split into two teams to examine different zones, such as foredunes and backdunes, simultaneously. While field crews took advantage of every opportunity to examine soil profiles in road cuttings, creek banks and the like, no excavation, augering or other sub-surface testing was undertaken during the survey phase of the study (cf. Burke 1993:23-24). Site locations were established with the use of topographic maps, aerial photographs and Global Positioning System (GPS) readings.

Survey Results

A major complication in effectively conducting and evaluating archaeological survey data from the region was a lack of access to the earlier site recordings made by Burke (1993) held by the Queensland Environmental Protection Agency. Although abbreviated survey results are available in Burke's (1993) report, an absence of detailed site descriptions and inconsistencies in location data prevented accurate field identification of previously recorded sites. These details have recently been obtained under the provisions of the *Freedom of Information Act 1992*. As a result of these problems, some of the sites reported by Lilley *et al.* (1997:Table 2) had already been recorded by Burke (1993). Further confusion arose as some of the pre-allocated State site numbers assigned to Burke had already been allocated to other sites by the time they came to be registered (M. Carter, Queensland Environmental Protection Agency, pers. comm., 1999) and many of Burke's sites were subsequently conflated on the basis of proximity when entered onto the database (Burke's original 93 sites from this area were registered as only 51 sites). Additionally, Burke (1993:Appendix 5) assigned pre-allocated site numbers to more than one site on a number of occasions (KE:A37-KE:A40, KE:A44-KE:A46 in Appendix 5), which was not addressed during the registration process. It should be noted that most of the site numbers listed in QDEH (1994:Appendix XVI) were among Burke's (1993) pre-allocated site numbers, which were superceded when registered by the Queensland Environmental Protection Agency. To simplify the multiple site designations, Appendix B presents a key which links actually-registered sites to Burke's (1993) site field numbers and pre-allocated site designations, as well as those assigned by other researchers, including those employed by the Gooreng Gooreng Cultural Heritage Project.

Appendix A is an attempt to synthesize the survey data for the area included in Rowland (1987), Burke (1993), Lilley *et al.* (1997) and the Queensland Environmental Protection Agency site database (obtained under the *Freedom of Information Act, 1992*). This task was complicated by variations in site definitions and recording strategies combined with problems in site provenience data related primarily to inadequate location data. For example, the site Lilley *et al.* (1997) and Ulm *et al.* (this volume) refer to as Eurimbula Site 1 (SCC43) is registered as six separate sites on the Queensland Environmental Protection Agency site database (KE:A49-KE:A54), which is a secondary conflation of Burke's (1993) original 20 separate sites.

Clearly, these variations would render as spurious any absolute quantitative comparisons between the sites presented in Appendix A. The general descriptions of the nature of observed archaeological materials, however, provide a basis for broadly characterizing the archaeological record of the study region.

A total of 79 Aboriginal cultural places is listed in Appendix A, including recording details, basic location data and a brief site description. In most cases this description includes all information available for the site. Figures 1 and 8-9 show site locations. Site types include stone quarries, axe grinding grooves, shell middens (Figures 10-11), stone-walled tidal fishtraps (Figures 12-13), stone artefact scatters, scarred trees and contact period sites. Low density shell middens are clearly the most common archaeological expression of Aboriginal behaviour in the area, dominated, without exception, by mud ark (*Anadara trapezia*) and/or commercial oyster (*Saccostrea commercialis*) (see also Burke 1993:40). Stone artefacts are commonly associated with larger shell middens (Figure 14) and rocky headlands. Lithic raw materials are dominated by locally available pyroclastic rhyolite and quartz with occasional non-local silcrete and banded chert artefacts. Flaked glass artefacts also occur on the surface of two large shell midden complexes (Figure 15). Several glass artefacts exhibit clear evidence of use in plant processing activities (Ulm *et al.* 1999).

Coupled with the results of previous studies, these extensive surveys have revealed a consistent pattern of site location. Extensive stratified shell midden deposits with evidence of multiple occupations and diverse activities are limited exclusively to tidal estuary margins in close proximity to their mouths. Such sites have been located on the northern and southern banks of Round Hill, Middle and Pancake Creeks. All are exposed in erosion faces extending over several kilometres. Relatively small, low density

surface scatters of marine shell and stone artefacts made on local materials were noted on exposed headlands, while midden deposits on the open beaches themselves were generally very limited in extent and composition and often located in deflated contexts. Beach ridges and transgressive dunes located adjacent to the modern coastline contain abundant evidence for extensive but shallow site complexes (Lilley 1994; Lilley and Ulm 1995).

Discussion of Survey Results

At this stage it is unclear how processes of erosion and progradation on the exposed coast have affected the differential preservation and visibility of sites, as has been observed elsewhere (e.g. Bird 1992; Godfrey 1989; Head 1987; Rowland 1989). Intensive surveys of the open coastline suggest an almost complete absence of cultural material on the low frontal dunes bordering the open ocean beach and a preponderance of material on the lower margins of major estuaries. That this pattern is an accurate reflection of past Aboriginal behaviours rather than an artificial pattern created by differential preservation of cultural materials by erosion of the exposed coast is supported not only by the absence of material on current coasts, but also by the absence of cultural material on particular coastal landforms. Although scatters of midden shell and stone artefacts have been recorded on numerous headlands on the exposed coast, they are very sparse compared to the abundance of material on estuary margins suggesting a qualitative pattern of settlement preference in these areas. This pattern may in part reflect patterns of resource distribution with lower creek margin sites often situated adjacent to a range of potential resource zones. Significantly, despite the proximity of large midden deposits on the lower estuaries to open beach habitats (in some cases <100m), only very occasional pipi (*Donax deltoides*) valves have been observed or recovered from excavated deposits. Only a single site in the region, the Middle Island Sandblow Site (KE:A67), exhibits significant quantities of this species. *Donax deltoides* is virtually the diagnostic signature of Aboriginal use of open coasts in southeast Queensland (e.g. Hall 1980; McNiven 1990, 1998). This pattern suggests that either this species was consumed and discarded at locations other than those identified, and which have been obscured or destroyed by erosional processes, or that the open coast was not a primary focus of resource extraction in this region.

McNiven (1985, 1989) identified a similar pattern at sites at the mouth of the Maroochy River and on the Inskip Point peninsula at Cooloola. He suggests that in southeast Queensland "major ocean beach shellfish (i.e. pipi) exploitation only occurred in contexts far removed from estuarine environments" (McNiven 1989:47), arguing that estuarine environments were preferentially exploited by people over the open beach owing to a greater productivity and diversity of resources in estuaries.

Excavation Summary

Two of the largest complexes of shell midden deposits in the area have been subject to limited test excavation (Figures 8 and 9): the Mort Creek Site Complex (KE:A41) on the west bank of Mort Creek at the northern end of Rodds Peninsula (Carter 1997; Carter *et al.* this volume; Lilley *et al.* 1996) and Eurimbula Site 1 (KE:A49-KE:A54) on the west bank of Round Hill Creek (Lilley *et al.* 1996; Ulm *et al.* this volume). Brief summaries of the excavations are presented below.

Mort Creek Site Complex

The Mort Creek Site Complex (KE:A41) is located on the west bank of Mort Creek on the west coast of Rodds Peninsula (Figure 8). The site consists of extensive areas of natural shell deposits (cheniers), cultural shell midden deposits and a stone-walled tidal fishtrap (Figures 3, 12). Three 50cm x 50cm test pits were excavated in different areas of the site in January 1995 in an attempt to distinguish areas of non-cultural deposit, such as cheniers, from shell middens. The excavation at 'White Patch' revealed a densely packed and highly fragmented shell deposit attributed to chenier development. It is characterized by a large range of species, including micro-molluscs. 'The Granites' excavation revealed cultural shell midden deposits, including stone artefacts and burnt fish bone, overlying a chenier deposit resting on microgranite bedrock. The excavation at 'A7' revealed more complex sediments, suggesting the interfingering of cultural and natural shell deposits.

Seven radiocarbon dates have been obtained for the site (Appendix C). The dates from the unequivocal cultural deposits at 'The Granites' suggest Aboriginal occupation before 2,300 cal BP (Wk-3941). Significantly, the radiocarbon dates from the chenier deposits suggest an overlap in the formation of natural and cultural shell deposits at the site. For further details see Carter *et al.* (this volume; also Carter 1997; Lilley *et al.* 1999; Lilley *et al.* 1996).

Eurimbula Site 1

Eurimbula Site 1 (KE:A49-KE:A54) is a large, stratified, midden complex intermittently exposed for some 2km in a steep erosion face on the west bank of Round Hill Creek (Figure 9). Three 50cm x 50cm test pits were excavated at 25m intervals along each of three transects placed perpendicular to the erosion

bank. Excavation yielded a cultural assemblage dominated by shellfish remains (mud ark and oyster), with small quantities of fish bone, charcoal and stone artefacts. Densities of cultural material were found to decrease markedly with distance from the creek.

Five radiocarbon dates are available for the site, revealing an occupational sequence spanning from c.3,200 cal BP (Wk-3945) to the historical period (Appendix C). For further details see Ulm *et al.* (this volume; also Lilley *et al.* 1996; Reid 1997).

Conclusion

The overview presented in this paper is a baseline synthesis of known archaeological resources in the study area. This consolidation of data gathered by a variety of investigators will provide a starting point for field verification and further investigations.

These results confirm Aboriginal occupation of the coast in this region from at least 3,000 BP, and conforms with other dates obtained for the Queensland coast (Ulm *et al.* 1995; cf. Nicholson and Cane 1994). In particular, the dates are similar to the earliest dates obtained at the site of Booral in the Great Sandy Straits to the south (Bowen 1998; Frankland 1990) as well as those from the Keppel Islands just to the north (Rowland 1985, 1992).

The general structure of the archaeological record of the region is qualitatively similar to adjacent areas to the north (Burke 1993; Border 1994) and south (McNiven 1990, 1998) which have featured in discussions of late Holocene change in Aboriginal societies on the Queensland coast (e.g. McNiven 1999; Ulm and Hall 1996). The investigation of the archaeological resources of the southern Curtis Coast therefore has the potential to contribute to discussions of such wider issues.

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Appendix A. List of Recorded Archaeological Sites on the Southern Curtis Coast.

Site ID	Site Type	Recorder	Location	Description
KE:A05	Stone Quarry	P. Smith 1.11.1980 C. Burke 26.3.93	24°14'09" 151°56'10"	Stone quarry on a quartzite outcrop (c.400m^2) within a sandstone headland, adjacent to the coastline at Rocky Point. High density artefact exposure, including a backed blade, scraper, two hammerstones and many small flakes. Burke observed large numbers of artefacts during a 1993 visit, although Reid failed to identify any unambiguous artefacts during a 1998 visit and called into question the cultural status of the stone exposure. References: Burke (1993); Lilley *et al.* (1997); Reid (1998).
KE:A06	Axe Grinding Locality	P. Smith 1.11.1980	24°14'09" 151°56'10"	Grinding grooves in sandstone, on a headland adjacent to the coastline at Agnes Water, c.35m from KE:A05. This site could not be relocated during a field inspection in 1998. References: Reid (1998).
KE:A08	Shell Midden/ Artefact Scatter	R. Neal 25.6.86	24°04'00" 151°30'00"	Sparse shell and stone artefact scatter exposed in sand vehicle tracks on a sloping dune adjacent to a rocky foreshore and mangrove swamp near Seven Mile Creek. Comprises mud ark (60%), club shell (20%) and oyster (20%) and artefacts manufactured on quartz (50%), black volcanic (10%) and rhyolite (40%). References: Neal (1986).
KE:A09	Shell Midden	R. Neal 25.6.86	24°04'00" 151°31'00"	Shell midden spotted from the air on a beach ridge adjacent to Seven Mile Creek bordered by a freshwater swamp. Rowland could not locate this site during a field inspection in 1986 and local informants suggested that it was quartz tailings from quarrying activities rather than a midden deposit. References: Neal (1986); Rowland (1987).
KE:A10	Shell Midden/ Artefact Scatter	M. Rowland 30.10.86	24°11'00" 151°52'00"	Five small low density surface shell scatters in eroding foredunes and deflated dunes on the ocean beach just north of Agnes Water. Includes pipi, oyster, nerite and occasional stone artefacts. References: Lilley *et al.* (1997); Rowland (1987).
KE:A11	Shell Midden	M. Rowland 30.10.86 C. Burke 22.4.93	24°10'58" 151°52'47"	Extensive shell midden complex bordering Round Hill Creek and bounded in the south by Tom's Creek, an eastern tributary of Round Hill Creek. Size not accurately determined owing to heavy vegetation. Material scattered on all 4WD tracks examined in the area. Maximum depth in all these locations is 10-20cm. Predominantly mud ark and oyster, with some stone artefacts. Site complex covers a large area and probably subsumes the sites registered separately as KE:A33, KE:A62 and KE:A63. References: Burke (1993); Rowland (1987).
KE:A12	Stone Quarry/ Shell Midden/ Artefact Scatter	M. Rowland 1.11.86 C. Burke 29.4.93	24°09'00" 151°53'04"	Site consists of the entire Round Hill Head headland. Isolated stone artefacts and artefact scatters located along exposed walking tracks and ridges. Two large pyroclastic rhyolite boulders near the navigation beacon at the tip of the headland exhibit a number of negative flake scars. Some oyster shell and flaking debris is scattered in surrounding crevices. Elsewhere, scattered shell fragments and stone artefacts occur, including cobble cores. References: Burke (1993); Lilley *et al.* (1997); Rowland (1987).
KE:A16	Shell Midden	M. Rowland 24.7.90 L. Godwin 4.10.90 C. Burke 30.4.93	24°12'10" 151°51'56"	Multi-component stratified shell mound (at least 16m x 10m) (c.160m^2) with a depth of more than 50cm, located in open woodland on a low rock terrace c.25m from Round Hill Creek. Extremely high density and spatially discrete shell deposit, dominated by mud ark, but also some oyster, stone artefacts, bone and charcoal. References: Burke (1993); Rowland (1987).
KE:A32	Contact Site	S. Davies 2.2.94	24°20'20" 151°34'00"	Miriam Vale Homestead and Cattle Station built c.1856. Historic and contact site, located just southeast of the modern town of Miriam Vale. The Station is the centre of religious and social affiliation to country for many Aboriginal families whose association to the Miriam Vale area spanned the pastoral occupation and into the distant past. This area was the location of several massacres and conflicts between white pastoralists, Native Mounted Police and Aborigines, including a major Aboriginal attack on 12 February 1857. After the establishment of the Homestead and until the time of the attacks, local Aborigines had been employed on the station. An Aboriginal camp was situated on the south bank of House Creek adjacent to the Homestead. References: Clarkson *et al.* (in prep.); Davies (1994).

Site ID	Site Type	Recorder	Location	Description
KE:A33	Shell Midden	C. Burke 22.4.93	24°11'40" 151°52'30"	Large, stratified midden complex (c.100,000m^2) intermittently exposed over low dunes abutting the base of a rhyolitic scree slope on the northern junction of Round Hill and Tom's Creeks. Several low, sandy, residual ridges which exhibit dense midden exposures were also located on the adjacent mud flats. Dominated by mud ark and oyster with occasional other species, stone and flaked glass artefacts. Burke originally recorded part of this site as very sparse oyster and mud ark scatters (c.800m^2) exposed on and around 4WD tracks in open woodland in a gently inclined area 5-20m from mud flats bordering Tom's Creek. Recent excavations in this general site complex have yielded dates on charcoal up to 1,110 ± 70 BP (Wk-7685). This site is probably part of the more extensive KE:A11 (see above). References: Burke (1993); Ulm (1999).
KE:A34	Shell Midden/ Artefact Scatter	C. Burke 27.1.93	24°04'25" 151°45'36"	Very sparse, surface scatter of shell and stone artefacts (c.2,500m^2) located on a graded survey line on a sand ridge c.1km inland from the central east coast of Middle Island. Oyster (n=20), mud ark (n=10) and stone artefacts (n=3). References: Burke (1993).
KE:A35	Shell Midden	C. Burke 27.1.93	24°06'49" 151°46'19"	Very sparse, surface shell scatter (c.20m^2) on top of a ridge on the southeast of Middle Island. Contains only 5 oyster fragments, no artefacts. This site is probably part of the larger site complex recorded by Lilley, registered as KE:A66. References: Burke (1993); Lilley (1994).
KE:A36	Shell Midden	C. Burke 27.1.93	24°06'47" 151°46'19"	Very sparse, surface shell scatter (c.1m^2) consisting of only three oyster shells on the southeast of Middle Island. This site is probably part of the larger site complex recorded by Lilley, registered as KE:A66. References: Burke (1993); Lilley (1994).
KE:A37	Shell Midden	C. Burke 30.1.93	24°07'16" 151°46'41"	A sparse, surface shell scatter (c.1,500m^2) disturbed by construction activities, located on a dune ridge on the southeast end of Middle Island. Dominated by oyster, but includes mud ark and mussel. This site is probably part of the larger site complex recorded by Lilley, registered as KE:A66 and also exposed in the north erosion bank of Middle Creek. References: Burke (1993); Lilley (1994); Lilley *et al.* (1997).
KE:A38	Shell Midden	C. Burke 30.1.93	24°06'08" 151°45'04"	Sparse, surface shell scatter (c.2,000m^2) containing one stone artefact on a ridge on the southwest of Middle Island. This site is probably part of the larger site complex recorded by Lilley, registered as KE:A65. References: Burke (1993); Lilley (1994).
KE:A39	Shell Midden	C. Burke 6.3.93	24°00'38" 151°37'26"	Sparse, surface shell scatter (c.50m^2) in an open area on a bank above the beach fronting Rodds Harbour on the northwest end of Rodds Peninsula. Dominated by mud ark with some oyster and mussel. References: Burke (1993).
KE:A40	Shell Midden	C. Burke 6.3.93	24°00'47" 151°37'37"	Very sparse, surface shell scatter (c.50m^2) 10m from beach fronting Rodds Harbour and 100m from the sea at low tide c.5masl on the northwest end of Rodds Peninsula. Dominated by oyster with some mud ark. References: Burke (1993).
KE:A41	Shell Midden/ Artefact Scatter	C. Burke 6.3.93	24°00'51" 151°37'43"	Extensive areas of natural shell deposits (cheniers), cultural shell midden deposits and a stone-walled tidal fishtrap located on the west bank of Mort Creek on the west coast of Rodds Peninsula. Shell exposures cover an area in excess of c.6,000m^2. Species include mud ark, oyster and club shell. Stone artefacts and fish bone noted in some excavations. Recent excavations returned a date on shell of 3,430 ± 140 BP (Wk-6986). References: Burke (1993); Carter (1997); Carter *et al.* (this volume); Lilley *et al.* (1996); Lilley *et al.* (1997).
KE:A42	Shell Midden	C. Burke 7.3.93	24°00'38" 151°41'18"	Sparse, stratified shell scatter (c.100m^2) on a ridge near Falls Creek on the central east coast of Rodds Peninsula. Includes oyster and turbo. Site located 500m from sea and rocks. References: Burke (1993).
KE:A43	Shell Midden	C. Burke 7.3.93	24°03'24" 151°41'48"	Group of midden exposures (c.900m^2) located on low residual beach ridges stranded on mud flats at the western extremities of Pancake Creek consisting of a shallow, linear midden exposed in a low erosion bank and three sparse shell scatters. Includes oyster, mud ark, thaid, club shell and mussel. References: Burke (1993).

Site ID	Site Type	Recorder	Location	Description
KE:A44	Shell Midden	C. Burke 9.3.93	24°02'22" 151°42'49"	Large stratified shell midden (c.8,320m^2) on top of a ridge above the beach and mud flats on the north bank of Pancake Creek, 100m to mud flats and 35m to a small tidal inlet. Dominated by mud ark and including club shell and oyster to a depth of 5cm determined by auger. Recent excavations conducted in this general site complex have yielded dates on charcoal up to 700 ± 140 BP (Wk-6993). References: Burke (1993); Lilley *et al.* (1997); Ulm (1999).
KE:A45	Shell Midden/ Artefact Scatter	C. Burke 9.3.93	24°02'21" 151°42'50"	A stratified linear shell midden (c.5,500m^2) located 50m from the sea 5-10cm deep and a shell scatter located 20-30m away from a small tidal inlet and beach flats on the north bank of Pancake Creek. Dominated by mud ark and including oyster and club shell, with a single stone artefact noted. Recent excavations conducted in this general site complex have yielded dates on charcoal up to 700 ± 140 BP (Wk-6993). References: Burke (1993); Lilley *et al.* (1997); Ulm (1999).
KE:A46	Shell Midden	C. Burke 9.3.93	24°02'16" 151°43'03"	A linear stratified midden (c.7,140m^2) eroding from a creek bank 20m west of a tidal inlet on the north bank of Pancake Creek. Shell lens is visible in the eroding profile for 238m and continues as a scatter on top of the dune for another 97m. Dominated by oyster and includes mud ark, club shell and charcoal. Recent excavations conducted in this general site complex have yielded dates on charcoal up to700 ± 140 BP (Wk-6993). References: Burke (1993); Lilley *et al.* (1997); Ulm (1999).
KE:A47	Shell Midden	C. Burke 9.3.93	24°02'05" 151°43'15"	Surface shell scatter (c.350m^2) on top of a beach ridge, 30m from mangroves and 15-20m from high water mark on the north bank of Pancake Creek. Includes oyster, mud ark and thaid. Poor visibility. Recent excavations conducted in this general site complex have yielded dates on charcoal up to 700 ± 140 BP (Wk-6993). References: Burke (1993); Lilley *et al.* (1997); Ulm (1999).
KE:A48	Shell Midden	C. Burke 9.3.93	24°02'25" 151°42'50"	Surface shell scatter (c.1,200m^2) in front of a tidal inlet before mud flats at a shack, 100m from the north shore of Pancake Creek. Includes oyster, mud ark and club shell. Recent excavations conducted in this general site complex have yielded dates on charcoal up to 700 ± 140 BP (Wk-6993). References: Burke (1993); Lilley *et al.* (1997); Ulm (1999).
KE:A49	Shell Midden	C. Burke 25.3.93	24°11'54" 151°51'33"	Three surface shell scatters (c.1,000m^2) located on the eroding west bank of Round Hill Creek. Includes oyster, mud ark and club shell. Excavations conducted in this general site complex have yielded dates on charcoal up to 3,020 ± 70 BP (Wk-3945). References: Burke (1993); Godwin (1990); Lilley *et al.* (1996); Lilley *et al.* (1997); Ulm *et al.* (this volume).
KE:A50	Shell Midden	C. Burke 25.3.93	24°11'44" 151°51'40"	One linear stratified midden (c.100m^2) exposed 5-10cm deep and two surface shell scatters (c.100m^2) located on the eroding west bank of Round Hill Creek. Some shell is eroding out of bank. Includes oyster and mud ark. Excavations conducted in this general site complex have yielded dates on charcoal up to 3,020 ± 70 BP (Wk-3945). References: Burke (1993); Godwin (1990); Lilley *et al.* (1996); Lilley *et al.* (1997); Ulm *et al.* (this volume).
KE:A51	Shell Midden	C. Burke 25.3.93	24°11'35" 151°51'42"	Two shell scatters (c.200m^2) on the west bank of Round Hill Creek exposed on the surface and up to 30cm deep in the erosion section. Dense *in situ* deposit of mud ark and oyster. Excavations conducted in this general site complex have yielded dates on charcoal up to 3,020 ± 70 BP (Wk-3945). References: Burke (1993); Godwin (1990); Lilley *et al.* (1996); Lilley *et al.* (1997); Ulm *et al.* (this volume).
KE:A52	Shell Midden	C. Burke 25.3.93	24°11'28" 151°51'45"	Six shell scatters (c.2,000m^2), including linear stratified deposits up to 10cm deep, on the west bank of Round Hill Creek. Dominated by mud ark with some shell eroding out of section, up to 5cm deep. Excavations conducted in this general site complex have yielded dates on charcoal up to 3,020 ± 70 BP (Wk-3945). References: Burke (1993); Godwin (1990); Lilley *et al.* (1996); Lilley *et al.* (1997); Ulm *et al.* (this volume).

Site ID	Site Type	Recorder	Location	Description
KE:A53	Shell Midden	C. Burke 26.3.93	24°11'04" 151°51'56"	Three surface shell scatters (c.450m^2) on top of a sand ridge adjacent to Round Hill Creek. Dominated by mud ark with a single large core of granite-like material noted. Excavations conducted in this general site complex have yielded dates on charcoal up to 3,020 ± 70 BP (Wk-3945). References: Burke (1993); Godwin (1990); Lilley *et al.* (1996); Lilley *et al.* (1997); Ulm *et al.* (this volume).
KE:A54	Shell Midden	C. Burke 26.3.93	24°10'56" 151°51'50"	Two surface shell scatters on top of a sand ridge and on a tidal flat (c.700m^2), and a linear stratified deposit (c.750m^2) on a sand ridge adjacent to Round Hill Creek. Dominated by mud ark and including oyster. Excavations conducted in this general site complex have yielded dates on charcoal up to 3,020 ± 70 BP (Wk-3945). References: Burke (1993); Godwin (1990); Lilley *et al.* (1996); Lilley *et al.* (1997); Ulm *et al.* (this volume).
KE:A55	Shell Midden/ Artefact Scatter	C. Burke 1.6.93	24°01'00" 151°45'46"	Sparse scatter of oyster shell including 7 stone artefacts (c.400m^2), located on the north side of Bustard Head. Raw materials may not be local. References: Burke (1993).
KE:A56	Shell Midden	C. Burke 21.4.93	24°02'31" 151°33'54"	Low density surface shell scatter (c.70m^2) located in an open, gently sloping area 10m from the beach on the west side of Innes Head, on the east bank of Seven Mile Creek. Dominated by oyster and includes mussel. References: Burke (1993).
KE:A57	Shell Midden/ Artefact Scatter	C. Burke 22.4.93	24°05'10" 151°38'52"	Three small surface shell scatters (c.70m^2) located on and around a graded dirt road c.50m from mangroves, on the east edge of an unnamed embayment on the west side of the Turkey Beach peninsula. Dominated by mud ark and including oyster and a single white quartz flaked piece. References: Burke (1993).
KE:A58	Artefact Scatter	C. Burke 22.4.93	24°05'44" 151°38'10"	Isolated stone artefact manufactured on banded chert located on mud flats on the east edge of an unnamed embayment on the west side of the Turkey Beach peninsula, c.50m from mangroves. References: Burke (1993).
KE:A59	Shell Midden/ Artefact Scatter	C. Burke 1.6.93	24°01'56" 151°44'40"	Very sparse surface shell scatter (c.24,000m^2), including one quartz flaked piece, located on the edge of mud flats on the Jenny Lind Creek side of Bustard Head. Dominated by mud ark and oyster and including club shell. References: Burke (1993).
KE:A60	Scarred Tree	C. Burke 30.4.93	24°12'51" 151°54'16"	Scarred tree located in the centre of Agnes Water. Scar is located on a large eucalyptus tree (Queensland blue gum or Moreton Bay ash). Scar measures 250cm x 46cm. References: Burke (1993); Lilley *et al.* (1997).
KE:A61	Shell Midden	C. Burke 17.5.93	24°01'56" 151°44'40"	Fairly dense discrete stratified shell midden with depth of 10cm, located on the east bank of Round Hill Creek, c.100m from KE:A16. Dominated by mud ark. Site damaged by bulldozer activity. References: Burke (1993); Lilley *et al.* (1997).
KE:A62	Shell Midden/ Artefact Scatter	C. Burke 22.5.93	24°10'57" 151°52'53"	Linear stratified midden (c.4,200m^2) with *in situ* lens of shell c.50cm below ground surface and up to 10cm thick. Subsurface material exposed in a large excavation behind the sewage treatment depot. Dominated by mud ark and including oyster and stone artefacts manufactured on a variety of raw materials. This site is probably part of the more extensive KE:A11 (see above). References: Burke (1993).
KE:A63	Shell Midden	C. Burke 22.5.93	24°11'10" 151°52'33"	Very sparse surface scatter (c.400m^2) of mud ark and oyster shell located on either side of a 4WD track. This site is probably part of the more extensive KE:A11 (see above). References: Burke (1993).
KE:A64	Shell Midden/ Artefact Scatter	I. Lilley 10-14.4.94	24°04'10" 151°43'35"	Shell midden complex (c.200,000m^2) up to 15cm deep on the central west coast of Middle Island. Dominated by mud ark and including oyster and a quartz flake. Located in low swampy melaleuca shrubland adjacent to mud flats on a tidal creek. References: Lilley (1994).
KE:A65	Shell Midden	I. Lilley 10-14.4.94	24°05'30" 151°45'00"	Shell midden complex (c.800,000m^2) located on high north-south trending dunes extending for c.7km along the central western side of Middle Island. Comprises mud ark, oyster, pipi and club shell. References: Lilley (1994).

Site ID	Site Type	Recorder	Location	Description
KE:A66	Shell Midden/ Artefact Scatter	I. Lilley 10-14.4.94	24°06'00" 151°44'30"	Shell midden complex (c.800,000m^2) located on high north-south trending dunes extending for c.5km along the central eastern side of Middle Island. Comprises mud ark, oyster and pipi as well as a quartz core. References: Lilley (1994).
KE:A67	Shell Midden	I. Lilley 10-14.4.94	24°03'44" 151°45'56"	Shell midden complex (c.140,000m^2) dominated by pipi up to 15cm deep on parabolic dunes and sandblows on the northeast end of Middle Island, bordered in the north and west by Jenny Lind Creek. Recent excavations in this general site complex have yielded dates on shell up to 980 ± 50 BP (Wk-7679). References: Lilley (1994); Lilley *et al.* (1997); Ulm (1999).
KF:A01	Shell Midden	C. Burke 6.3.93	23°58'52" 151°36'48"	Very sparse surface shell scatter dominated by oyster on the east side of Richards Point, Rodds Peninsula. Total of 20 fragments. MNI=6-10. References: Burke (1993).
KF:A02	Shell Midden	C. Burke 7-8.3.93	23°59'20" 151°40'06"	Four low density shell scatters (c.1,200m^2) up to 5cm deep dominated by oyster but also including chiton, austros, turbos and mud ark, located on the northeast coast of Rodds Peninsula. Scatters in close proximity to beach, tidal inlet and rock platforms. References: Burke (1993).
KF:A03	Shell Midden	C. Burke 8.3.93	23°59'23" 151°39'44"	Two surface shell scatters (c.1,400m^2) located behind dunes and a tidal inlet 50-60m from ocean and rock platforms, located on the northeast coast of Rodds Peninsula. Dominated by oyster and including mud ark, chiton and turbo. References: Burke (1993).
KF:A04	Shell Midden	C. Burke 8.3.93	23°59'13" 151°39'29"	Very sparse surface shell scatter (c.40m^2) of oyster 20m from beach and rock platforms, located on the northeast coast of Rodds Peninsula, c.10masl. Site is behind thick scrub. References: Burke (1993).
KF:A05	Shell Midden	C. Burke 8.3.93	23°59'05" 151°39'22"	Two shell scatters (c.1,700m^2) at least 15cm deep situated on a bank near the beach c.20m from the sea and rock platforms, located on the northeast coast of Rodds Peninsula. Dominated by oyster and including mud ark, chiton and turbos. References: Burke (1993).
KF:A06	Shell Midden	C. Burke 8.3.93	23°59'27" 151°40'14"	Two sparse oyster scatters (c.150m^2) located 50m from beach and rocks, located in the vicinity of foredunes on the northeast coast of Rodds Peninsula. Freshwater creeks in close vicinity to deposits. References: Burke (1993).
KF:A07	Shell Midden	C. Burke 9.3.93	23°58'52" 151°38'52"	Sparse oyster deposits (c.200m^2) up to 5cm deep situated c.100m from sea and 5masl on a bank on top of a ridge, located on the northeast coast of Rodds Peninsula. Dominated by oyster and including austro. References: Burke (1993).
KF:A08	Artefact Scatter	C. Burke 9.3.93	23°58'33" 151°37'31"	Isolated stone artefact on a steep rocky slope on top of a headland on the east side of Richards Point, Rodds Peninsula, c.20masl and 20m from rock platforms and ocean. References: Burke (1993).
KF:A09	Shell Midden	C. Burke 9.3.93	23°58'45" 151°37'44"	Surface shell scatter (c.200m^2) on beach 0.5masl and 10m from rock platforms and ocean, 500m northwest of Richards Point, Rodds Peninsula. Dominated by oyster and including mud ark and austros. References: Burke (1993).
KF:A10	Shell Midden	C. Burke 9.3.93	23°58'45" 151°37'44"	Surface oyster scatter (c.800m^2) at least 5cm deep situated 50m from beach in open woodland, located on the northeast coast of Rodds Peninsula. Ocean and rock platforms 200m from site. Augering revealed shell to 5cm in depth. References: Burke (1993).
KF:A11	Shell Midden	C. Burke 9.3.93	23°58'51" 151°37'18"	Sparse surface scatters (c.500m^2) of oyster and mud ark, 50-100m from rock platforms and ocean, located on the northeast coast of Rodds Peninsula. Tidal creek in close vicinity. References: Burke (1993).
KF:A12	Fish Trap	C. Burke 9.3.93	23°58'40" 151°37'25"	Stone-walled fish trap of unknown dimensions located in a small bay to the immediate west of Richards Point. The trap appears to contain water at both high and low tide. The trap is in the shape of an arc with a formed opening in the centre of it. References: Burke (1993); Lilley *et al.* (1997).

Site ID	Site Type	Recorder	Location	Description
KF:A13	Shell Midden	C. Burke 8.3.93	23°59'24" 151°40'13"	Very sparse surface shell scatters (c.50m^2), mostly oyster, c.20-50m from rock platforms and ocean. Freshwater creek located 10-50m away. References: Burke (1993).
KF:A14	Shell Midden	C. Burke 8.3.93	23°59'08" 151°39'11"	Sparse surface shell scatters (c.3,650m^2) situated on top of a dune ridge in a clearing behind the beach, located on the northeast coast of Rodds Peninsula. Dominated by oyster and including mud ark, chiton and mussel. Tidal creek is located nearby. References: Burke (1993).
KF:A15	Shell Midden	C. Burke 8.3.93	23°59'08" 151°39'09"	Sparse surface shell scatter, mostly oyster, situated on top of a dune ridge, located on the northeast coast of Rodds Peninsula. Tidal creek is located nearby. References: Burke (1993).
KF:A16	Shell Midden	C. Burke 8.3.93	23°58'55" 151°38'50"	Surface oyster scatter (c.25m^2) situated c.100m from ocean and 50m from rock platforms, 5masl, located on the northeast coast of Rodds Peninsula. References: Burke (1993).
SCC10	Shell Midden/ Artefact Scatter	S. Ulm	24°11'00" 151°49'30"	Extensive surface scatter of shell and stone artefacts visible on Eurimbula Creek 4WD access track. Bracken fern fringes the track on both sides making it difficult to determine the extent of the scatter due to lack of visibility. Includes flakes, flaked pieces, cores and manuports manufactured on pyroclastic rhyolite, quartz and indurated mudstone. Shell includes mud ark and oyster. References: Lilley *et al.* (1997).
SCC12	Artefact Scatter	S. Ulm	24°14'30" 151°56'30"	Stone artefact scatter on 4WD road shoulder on headland. Pyroclastic rhyolite artefacts found eroding out of a nearby road cutting up to 60cm below ground surface. Cores, flakes, flaked pieces, grinding stone made on indurated mudstone, pyroclastic rhyolite, silcrete, quartz and quartzite. Some retouched artefacts. References: Lilley *et al.* (1997).
SCC17	Artefact Scatter	S. Ulm	24°16'00" 151°56'50"	Two stone artefacts located on the open coast on the south side of the Red Rock headland, south of Rocky Point. One broken waterworn pebble manuport with cortex and one flake on a red igneous rock (silcrete?). References: Lilley *et al.* (1997).
SCC18	Artefact Scatter	S. Ulm	24°16'00" 151°56'50"	Two pyroclastic rhyolite cores and one andesite flake located on a walking track on the open coast on the south side of the Red Rock headland, south of Rocky Point. References: Lilley *et al.* (1997).
SCC19	Artefact Scatter	S. Ulm	24°14'00" 151°56'00"	Low density scatter of pyroclastic rhyolite flakes and flaked pieces exposed on eroding walking and vehicle tracks across the northern Rocky Point headland. References: Lilley *et al.* (1997).
SCC21	Artefact Scatter	S. Ulm	24°14'00" 151°56'00"	Scatter of 20 flakes and flaked pieces manufactured on chert, pyroclastic rhyolite and quartzite exposed in an eroding road cutting on the northern Rocky Point headland. References: Lilley *et al.* (1997).
SCC26	Shell Midden/ Artefact Scatter/ Stone Quarry	S. Ulm	24°07'00" 151°46'30"	Extensive shell midden and quarry site complex (140,000m^2) located on the south bank of Middle Creek close to its mouth. Including oyster, mud ark, nerite and pipi. Shell material visible in erosion sections up to 25cm deep. Extensive outcrop of modified pyroclastic rhyolite. Surface artefact densities up to 110/m^2. Recent excavations have yielded dates on charcoal up to 1,640 ± 150 BP (Wk-6361). References: Lilley *et al.* (1997); Reid (1998).
SCC30	Artefact Scatter	S. Ulm	24°09'00" 151°46'30"	Small stone artefact scatter on salt pan at the southern extremities of Middle Creek estuary where low mangroves begin at base of creek. At least 10 pyroclastic rhyolite cores and 2 flakes spread over c.200m^2 area c.20m west of low casuarina fringe. Several isolated fragments of shell noted along mangrove fringe. References: Lilley *et al.* (1997).
SCC31	Artefact Scatter	S. Ulm	24°08'30" 151°47'00"	26 pyroclastic rhyolite artefacts embedded in a muddy surface on mud flats in the centre of open area on Middle Creek estuary. References: Lilley *et al.* (1997).
SCC35	Artefact Scatter	S. Ulm	24°09'30" 151°48'00"	9 pyroclastic rhyolite artefacts scattered over a 50m^2 area c.30m southeast of bridge on saltpan at the northern extremity of Eurimbula Creek. References: Lilley *et al.* (1997).

Site ID	Site Type	Recorder	Location	Description
SCC36	Shell Midden/ Artefact Scatter	S. Ulm	24°09'40" 151°48'10"	Low density scatter of oyster shell fragments and two water-worn manuports visible on bank about 10m through mangroves to channel of Eurimbula Creek. References: Lilley *et al.* (1997).
SCC37	Shell Midden	S. Ulm	24°09'54" 151°49'02"	Scatter of midden shell visible in low (c.30cm high) erosion bank on mangrove fringe of Eurimbula Creek. Some sparse scattered oyster fragments visible on surface. Main scatter c.5m^2 eroding out of bank onto flat mangrove fringe. Shell lens visible in erosion bank c.18cm below surface and c.3cm thick for c.3m along bank. Density=c.108/m^2. Includes oyster and mud ark. Recent excavations in this general site complex have yielded a date on charcoal of 230 ± 60 BP (Wk-7680). References: Lilley *et al.* (1997); Ulm (1999).
SCC38	Shell Midden	S. Ulm	24°10'04" 151°49'22"	Scatter of shell visible on top of a low dune c.20m northeast of mangrove fringe of Eurimbula Creek mainly visible in the burrow of unknown animal. Scatter spread over an area of c.10m^2. Max. Density=25/m^2. Predominantly oyster, with some nerites, mud ark, whelk and telescopium. Located in dry rainforest thicket. Recent excavations in this general site complex have yielded modern radiocarbon dates. References: Lilley *et al.* (1997); Ulm (1999).
SCC39	Shell Midden/ Artefact Scatter	S. Ulm	24°10'10" 151°49'36"	Very sparse scatter of shell visible on low (c.1m high) erosion bank c.10m north of Eurimbula Creek. Includes mud ark, oyster and club shell as well as several flaked pieces of quartz and pyroclastic rhyolite and some larger, possibly ground, implements manufactured on the latter. References: Lilley *et al.* (1997).
SCC48	Shell Midden	S. Ulm	24°11'50" 151°52'10"	Mounded mud ark midden disturbed by bush turkey nesting activity located near the eastern bank of Round Hill Creek and south bank of Tom's Creek, Agnes Water. References: Lilley *et al.* (1997).
SCC50	Scarred Tree	S. Ulm	24°15'30" 151°53'00"	Possible scarred tree which has been felled for construction of a power easement on the southern margin of Round Hill National Park. References: Lilley *et al.* (1997).
SCC51	Artefact Scatter	S. Ulm	24°15'00" 151°55'30"	Low density scatter of stone artefacts located along the northeast margin of Deepwater swamp, southwest of Rocky Point. References: Lilley *et al.* (1997).
SCC55	Shell Midden	S. Ulm	24°04'30" 151°39'00"	Thin lens of oyster eroding out of low bank c.5cm below ground surface along c.4m of bank at Turkey Beach. Area to the west and south has been leveled for the construction of a small toilet block and BBQ area.
SCC58	Shell Midden	S. Ulm	24°01'40" 151°44'40"	Surface scatter of shell on a high dune ridge up to 50m inland on the east bank of Pancake Creek immediately behind a navigation beacon opposite Pancake Point. Visible shell appears to be associated with crab burrowing activity and is probably derived from subsurface deposits. Oyster dominant but also includes mud ark and club shell. A small silcrete core was also noted. References: Ulm (1999).

Appendix B. Table of Site Name Synonyms for Registered Sites on the Southern Curtis Coast.

Registered Site #	Burke (1993) Field #	Burke (1993) Pre-Allocated Site #	GGCHP Site ID #	Other Designation
KE:A05	CC132		SCC20	
KE:A06				
KE:A08				Boyne Creek I (Neal 1986)
KE:A09				Boyne Creek II (Neal 1986)
KE:A10			SCC2-SCC6	MV1 (Rowland 1987)
KE:A11	CC144			MV2 (Rowland 1987)
KE:A12	CC139 CC043 CC044 CC045 CC046 CC047 CC048 CC049 CC050 CC051 CC052	 KE:A37 KE:A38 KE:A39 KE:A40 KE:A41 KE:A42 KE:A43 KE:A44 KE:A45 KE:A46	SCC1	MV3 (Rowland 1987)
KE:A16	CC147		SCC53	MV4 (Rowland 1987)
KE:A32				Miriam Vale Homestead (Davies 1994)
KE:A33	CC141 CC142	KE:A31 KE:A30		Tom's Creek Site Complex (Ulm 1999)
KE:A34	CC005	KE:A32		
KE:A35	CC006	KE:A33		Site Group 4 (Lilley 1994)
KE:A36	CC007	KE:A34		Site Group 4 (Lilley 1994)
KE:A37	CC008	KE:A35	SCC46	Site Group 4 (Lilley 1994)
KE:A38	CC009	KE:A36		
KE:A39	CC065	KE:A47		
KE:A40	CC066	KE:A48		
KE:A41	CC067 CC068	KE:A49 KE:A50	SCC42	Rodds Peninsula Site Complex (Carter 1997) Mort Creek Site Complex (Carter *et al.* this volume)
KE:A42	CC069	KE:A51		
KE:A43	CC090 CC091 CC092 CC093	KE:A52 KE:A53 KE:A54 KE:A55		
KE:A44	CC094	KE:A56	SCC45	Pancake Creek Site Complex (Ulm 1999)
KE:A45	CC095 CC096	KE:A57 KE:A58	SCC45	Pancake Creek Site Complex (Ulm 1999)
KE:A46	CC097	KE:A59	SCC45	Pancake Creek Site Complex (Ulm 1999)
KE:A47	CC098	KE:A60	SCC45	Pancake Creek Site Complex (Ulm 1999)
KE:A48	CC099	KE:A61	SCC45	Pancake Creek Site Complex (Ulm 1999)

Registered Site #	Burke (1993) Field #	Burke (1993) Pre-Allocated Site #	GGCHP Site ID #	Other Designation
KE:A49	CC112A CC113A CC131	KE:A62 KE:A63 KE:A64	SCC43	Eurimbula Site 1 (Ulm *et al.* this volume)
KE:A50	CC114 CC115 CC116	KE:A65 KE:A66 KE:A67	SCC43	Eurimbula Site 1 (Ulm *et al.* this volume)
KE:A51	CC117 CC118	KE:A68 KE:A69	SCC43	Eurimbula Site 1 (Ulm *et al.* this volume)
KE:A52	CC119 CC120 CC121 CC122 CC123 CC124	KE:A70 KE:A71 KE:A72 KE:A73 KE:A74 KE:A75	SCC43	Eurimbula Site 1 (Ulm *et al.* this volume)
KE:A53	CC125 CC126 CC127	KE:A76 KE:A77 KE:A78	SCC43	Eurimbula Site 1 (Ulm *et al.* this volume)
KE:A54	CC128 CC129 CC130	KE:A79 KE:A80 KE:A81	SCC43	Eurimbula Site 1 (Ulm *et al.* this volume)
KE:A55	CC174	KE:A82		
KE:A56	CC133	KE:A83		
KE:A57	CC135 CC136 CC137	KE:A84 KE:A85 KE:A86		
KE:A58	CC138	KE:A87		
KE:A59	CC173	KE:A88		
KE:A60	CC148	KE:A89	SCC52	
KE:A61	CC169	KE:A90	SCC49	
KE:A62	CC140	KE:A91		
KE:A63	CC143	KE:A92		
KE:A64				Site Group 1 (Lilley 1994)
KE:A65				Site Group 2 (Lilley 1994)
KE:A66				Site Group 4 (Lilley 1994)
KE:A67			SCC47	Site Group 5 (Lilley 1994) Middle Island Sandblow Site (Ulm 1999)
KF:A01	CC064	KF:A01		
KF:A02	CC071 CC072 CC073 CC074	KF:A02 KF:A03 KF:A04 KF:A05		
KF:A03	CC075 CC076	KF:A06 KF:A07		
KF:A04	CC077	KF:A08		

Registered Site #	Burke (1993) Field #	Burke (1993) Pre-Allocated Site #	GGCHP Site ID #	Other Designation
KF:A05	CC078 CC080	KF:A09 KF:A10		
KF:A06	CC081 CC082	KF:A11 KF:A12		
KF:A07	CC087 CC088	KF:A13 KF:A14		
KF:A08	CC101	KF:A15		
KF:A09	CC102	KF:A16		
KF:A10	CC103	KF:A17		
KF:A11	CC104 CC105	KF:A18 KF:A19		
KF:A12	CC100	KF:A20	SCC54	
KF:A13	CC070 CC083	KF:A21 KF:A22		
KF:A14	CC084 CC085	KF:A23 KF:A24		
KF:A15	CC086	KF:A25		
KF:A16	CC089	KF:A26		
			SCC10	
			SCC12	
			SCC17	
			SCC18	
			SCC19	
			SCC21	
			SCC26	SCC26-SCC29, SCC41 (Lilley *et al.* 1997) Ironbark Site Complex (Reid 1998)
			SCC30	
			SCC31	
			SCC35	
			SCC36	
			SCC37	Eurimbula Creek 1 (Ulm 1999)
			SCC38	Eurimbula Creek 2 (Ulm 1999)
			SCC39	
			SCC48	
			SCC50	
			SCC51	
			SCC55	
			SCC58	

Appendix C. Radiocarbon Dates from Excavated Sites on the Southern Curtis Coast.

Site	Square	XU	Depth (cm)	Lab. No.	Sample	Weight (g)	$d^{14}C$ (‰)	$\delta^{13}C$ (‰)	$D^{14}C$ (‰)	% Modern	^{14}C Age	Calibrated Age/s[c]
Eurimbula Site 1	1	5	9.5	Wk-5601	charcoal	2.5	-30.8 ± 7.6	-27.0 ± 0.2	-26.9 ± 9.3	97.3 ± 0.9	220 ± 80	430(272,178,149,9,0*)0*
Eurimbula Site 1	1	10	35	Wk-3944	shell[a]	71.1	-219.8 ± 4.5	-0.8 ± 0.2	-257.6 ± 5.2	74.2 ± 0.5	2390 ± 60	2170(1997)1842
Eurimbula Site 1	1	10	35	Wk-5215	charcoal	2.1	-181.3 ± 12.7	-25.3 ± 0.2	-180.8 ± 15.5	81.9 ± 1.5	1600 ± 160	1821(1412)1167
Eurimbula Site 1	2	9	50	Wk-3945	charcoal	10.3	-315.3 ± 4.4	-26.5 ± 0.2	-313.3 ± 5.3	68.7 ± 0.5	3020 ± 70	3352(3200,3197,3154)2943
Eurimbula Site 1	Near 7	0	0	Wk-3946	shell[a]	90.7	-17.7 ± 4.8	0.0 ± 0.2	-66.8 ± 5.6	93.3 ± 0.6	560 ± 50	300(234)0*
MCSC	A7	4	18-20.2	Wk-5602	shell[a]	47.3	-264.7 ± 3.7	-0.3 ± 0.2	-301.0 ± 4.3	69.9 ± 0.4	2880 ± 50	2755(2692)2450
MCSC	A7	6	22.6-26.7	Wk-3937	shell[a]	75.2	-269.3 ± 4.0	0.1 ± 0.2	-305.9 ± 4.7	69.4 ± 0.5	2930± 60	2826(2718)2494
MCSC	A7	9	32.4-37	Wk-3938	shell[a]	81.2	-249.3 ± 4.3	0.1 ± 0.2	-286.9 ± 5.0	71.3 ± 0.5	2720 ± 60	2681(2370)2283
MCSC	Granite	11M	45.5-52.1	Wk-3941	shell[a]	71.3	-246.4 ± 4.5	-0.2 ± 0.2	-283.8 ± 5.3	71.6 ± 0.5	2680 ± 60	2598(2339)2188
MCSC	Granite	11C	45.5-52.1	Wk-3940	shell[b]	66.7	-296.9 ± 4.4	0.7 ± 0.2	-333.1 ± 5.1	66.7 ± 0.5	3260 ± 70	3304(3075)2865
MCSC	WP	4	12.8-18.4	Wk-3942	shell[a]	79.6	-222.3 ± 5.7	0.6 ± 0.2	-262.2 ± 6.6	73.8 ± 0.7	2440 ± 80	2307(2071)1861
MCSC	WP	10	37.6-44.8	Wk-3943	shell[a]	74.8	-235.9 ± 4.4	-0.5 ± 0.2	-273.4 ± 5.1	72.7 ± 0.5	2570 ± 60	2358(2273)2057

[a] *Anadara trapezia*

[b] Mixed shell consisting of *Saccostrea*, *Polynices*, *Nerita chamaeleon*, *Placamen calophyllum*, *Fragum hemicardium*, *Gafrarium australe*, *Cymatium* sp., *Corbula* sp., *Antigona chemnitzii*, *Trisidos tortuosa*, *Tapes dorsatus*, *Meropesta* sp., *Pinctada* sp., *Trichomya hirsuta*, *Bembicium auratum*, *Calthalotia arruensis* and *Anadara trapezia*.

[c] Conventional ^{14}C ages are corrected for $^{13}C/^{12}C$ fractionation and were calibrated using the CALIB (v3.0.3c) computer program (Stuiver and Reimer 1993). Determinations based on charcoal samples were calibrated using the bi-decal atmospheric calibration curve using the datasets of Pearson and Stuiver (1993) and Stuiver and Pearson (1993) with no laboratory error multiplier. Forty years were subtracted before calibration to correct for ^{14}C variations between northern and southern hemispheres. Dates on marine shell samples were calibrated using the marine calibration dataset of Stuiver and Braziunas (1993) with a $\triangle R$ correction value of -5 ± 35. The calibrated ages reported span the 2σ calibrated age-range.

0* Represents a ‘negative’ or ‘modern’ age BP.