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ABORIGINAL ARCHAEOLOGY OF THE CORROBOREE BEACH DUNE FIELD, FRASER ISLAND: RE-SURVEY AND RE-ASSESSMENT

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Insights into Aboriginal archaeological sites within the Corroboree Beach dune field near Indian Head on Fraser Island were provided by surveys in the 1970s. Subsequent re-survey of the same area in 1993 revealed nearly four times the number of sites, six times the range of faunal remains and a new range for SE Queensland's most distinctive stone artefact type - the bevel-edged tool. Although insights into past Aboriginal use of the area remain rudimentary, it is suggested that activity may have focused on seasonal super-abundances of fish. Backed blades suggest use of the area as early as 3,000-4,000 years ago while flaked bottle glass tools and clay pipes on sites reflect contact with Europeans during the mid-to-late 19th century. These new insights into the age, scale and complexity of Aboriginal sites indicate that Corroboree Beach represents one of the largest Aboriginal site complexes recorded in southern coastal Queensland. Dramatic changes in the form and status of sites at Corroboree Beach over a short period of less than 20 years reveals the need for cultural heritage managers to develop more flexible management models that accommodate the dynamic nature of archaeological sites and place greater emphasis on systematic site monitoring and periodic updating of impact mitigation strategies. □ *Aboriginal archaeology, cultural heritage management, Fraser Island.*

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As part of the lead up to the World Heritage listing of Fraser Island in 1992, a 20-year management plan was prepared for cultural heritage sites on the Island and the broader Great Sandy Region (Fraser Implementation Unit, 1994; McNiven, 1992a, 1994a). The plan identified the east coast of Fraser Is as a high priority area requiring immediate characterisation and assessment. The coastline was divided into three sections for 3-stage field assessment: Stage I focused on Corroboree Beach (McNiven, 1993a, 1993b); Stage II on remaining sections of the coast south to Hook Point (McNiven, 1994b); and Stage III is planned for remaining northern sections to Sandy Cape (Fig., 1).

This paper presents findings of a survey of Aboriginal archaeological sites within a large mobile dune field backing Corroboree Beach (Fig. 1), in the Great Sandy National Park (GSNP) south of Indian Head (25°00'S, 153°22'E). The survey represents a re-survey of the dune field as numerous sites had already been recorded across the area by Peter Lauer (Anthropology Museum, The University of Queensland) in the mid-1970s. However, neither site recording forms nor detailed site impact information resulted from this initial research. Consequently, the existing site database was insufficient to allow the develop-

ment of detailed management plans. The management focus of this project necessitated a re-survey of the entire coastline to record relevant information.

The study area is within the GSNP and comprises a complex of sparsely vegetated mobile sand dunes. The dune field is wedge-shaped and extends for 6km south of Indian Head and is 800m across at its widest point in the north. Dunes consist largely of yellow-white quartz sands with rich seams of black mineral sands (rutile and ilmenite) deposited during the Holocene (Connah, 1948, 1961; Grimes, 1987). Lower elevation dunes also contain extensive wave-deposited layers of pumice nodules originating from recent (<6,000 year old) volcanic eruptions across the western Pacific (Bill Ward, Griffith University, pers. comm., 1993).

Three major forms of sand dunes run sub-parallel to the present beach (Fig. 2). Low (<5m high) foredunes flank the eastern parts of the dune field and extend up to 200m inland from the HWM. An extensive deflation zone consisting of a complex of shallow blowouts and low dune residuals runs through the centre of the dune field. Prolonged wind erosion across the northern half of the deflation zone has created a mosaic of damp sand pans level with the watertable, low

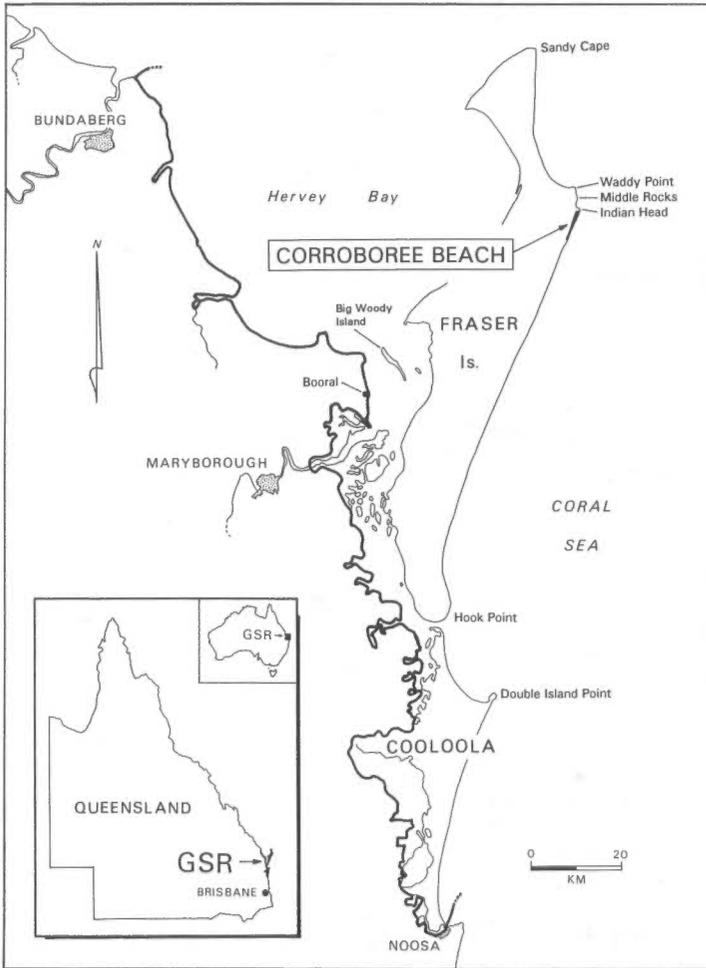


FIG. 1. Location of Corroboree Beach study area within the Great Sandy Region (GSR).

(<2m high) pumice-capped dune residuals and low (<5m high) mobile dunes. Less severe erosion of dunes across the southern sections of the deflation zone has resulted in an alternating pattern of blowout depressions and large (5-10m high) dune residuals. The western sections of the dune field rise dramatically up the erosion face of high coastal dunes. Across the north, wind erosion is cutting into old forested dunes (as revealed by large tree stumps) and redepositing sands further inland to form huge bare sand deposits up to 80m ASL. Erosion of high vegetated dunes across the southern sections of the study area is less severe with remobilised sand deposits restricted to a series of linear dunes extending inland up forested dune valleys.

rock pools around the base of Indian Head. The appearance of all pebbles within the inter-tidal zone indicates deposition through wave action, possibly from submerged sources on the continental shelf, given that such pebbles are not part of the known geology of Fraser Island (Grimes, 1987; James, 1977; Ward, 1977; Whitehouse, 1968).

Freshwater is available across many parts of the study area. Damp sand pans across the north enable access to unlimited water supplies, particularly after extended periods of rain when many pans become submerged by up to 0.5m of freshwater. Access to freshwater across the south

A range of stone sources suitable for artefact manufacture occur within, or immediately adjacent to, the study area. Older (Pleistocene) dune sequences exposed along the erosion face of the high coastal dunes exhibit thin, ferruginous sandstone layers formed through the leaching and subsequent deposition of oxides. These outcrops often extend over 1,000m² in area and consist of dense surface scatters of small (generally less than 10cm long), thin (0.5-3cm thick) tabular fragments. Trachyte is freely available in the form of either water-worn cobbles and boulders from around the base of Indian Head or small to large weathered fragments from across the headland. Indian Head belongs to a series of trachyte volcanics (Grimes, 1987) forming headlands to the immediate north (Middle Rocks and Waddy Point) (Carlsen & Wilson, 1968:15). Basalt is available also at Waddy Point and Middle Rocks in the form of a number of exposed dykes. A low density scatter of small, flat, water-worn pebbles generally <5cm in length, is found along Corroboree Beach at low tide. The pebbles are mostly either quartz or quartzite. Similar pebbles are found within



FIG. 2. General view of northern sections of Corrobooree Beach dune field looking north showing rear of foredunes (right), deflation zone with pumice residuals (centre) and high sand dunes (left).

can be obtained by digging shallow (0.5m deep) wells into the base of sandblows.

Vegetation across nearly the entire dune field is herbaceous ground cover. Sand spinifex grass (*Spinifex sericeus*) is the most common ground cover. Extensive stands of horsetail she-oak or casuarina (*Casuarina equisetifolia*) shrubs are found on foredunes and along the vegetated western margins of the study area. Low-lying areas in close proximity to the watertable often support discrete patches of restiads (Swamp reeds). The entire western boundary of the study area supports mixed shrubland of pandanus (*Pandanus tectorius*) and banksia (*Banksia integrifolia*) (Queensland Department of Forestry [now Queensland Department of Natural Resources], Fraser Island Vegetation Map, North Sheet, 1:50,000, Edition 2).

The marine fish resource base immediately east of the survey area is very high (Morton & Healy, 1992). Key species include sea mullet (*Mugil cephalus*), tailor (*Pomatomus saltatrix*), whiting (*Sillago* sp.), yellowfin bream (*Acanthopagrus australis*), and dart (*Trachinotus russelli*). Of these, mullet and tailor are the most

abundant, particularly during their huge annual winter/spring spawning migrations up the southern Queensland coast.

A variety of edible shellfish can be obtained easily within the intertidal zone immediately adjacent to the survey area (pers. obs). The most widely distributed and abundant of these is the wong (*Donax deltooides*) which occurs in large colonies within sandy sediments of the surf beaches. Sand snails (*Polinices incei*) can also be found with wongs. Around the three headlands to the north of the survey area is found a different range of shellfish adapted to rocky platforms. Examples include thaidis (*Thais orbita*), nerites (*Nerita* spp.), periwinkles (Trochidae), and chitons (Chitonidae).

In marked contrast to marine foods, the terrestrial animal resource base is extremely limited and reflects the poor faunal standing of the entire island (Barry & Campbell, 1977: 147). The only mammals observed across the Corrobooree Beach dune field during the study were dingoes (*Canis lupus dingo*) and feral horses. Carcasses observed extend the range to snakes, birds, frogs/toads, and swamp wallabies (*Wallabia bicolor*). However, mixed shrublands which

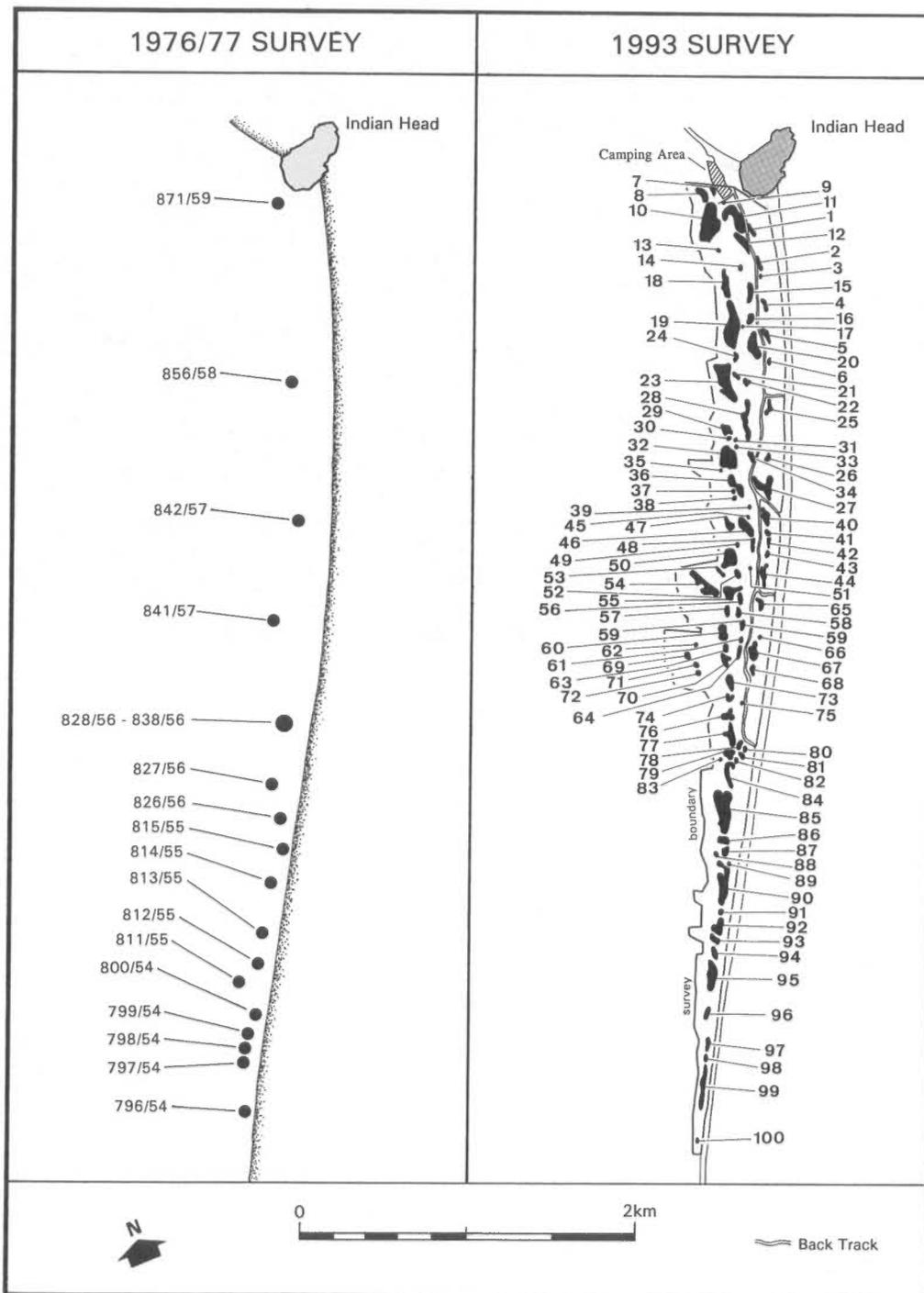


FIG. 3. Aboriginal sites within Corroboree Beach dune field as recorded by Lauer in 1976/77 and McNiven in 1993.

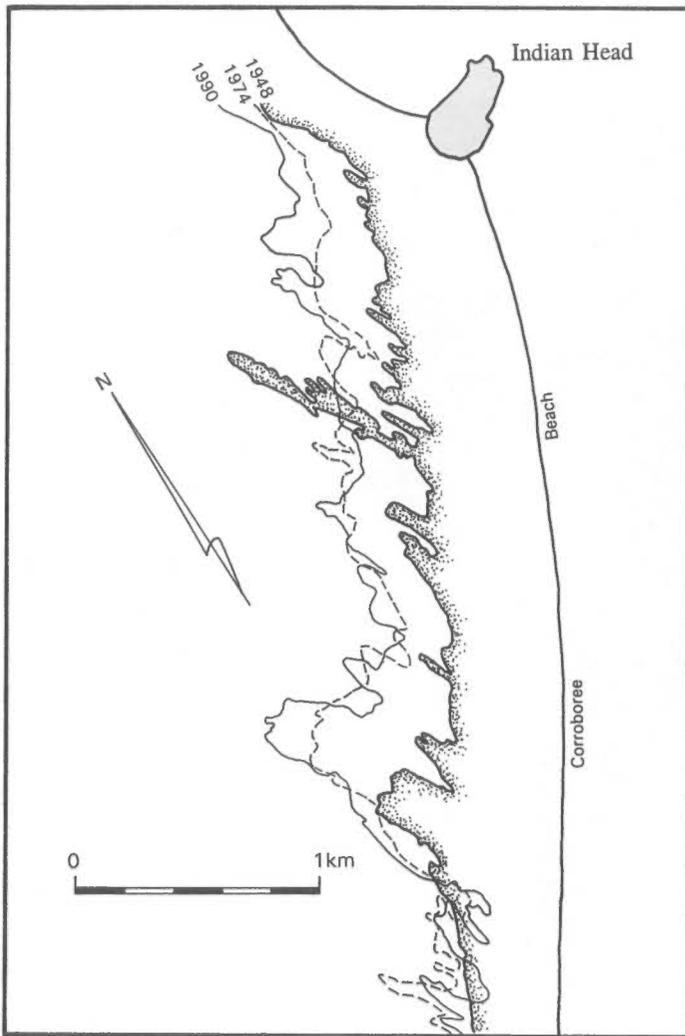


FIG. 4. Sand movements across the northern sections of the Corroboree Beach dune field (source: aerial photographs – Queensland Beach Protection Authority).

back the dune field, provide habitats for swamp wallabies, sugar gliders (*Petaurus* sp.), pygmy gliders (*Acrobates pygmaeus*), brindled bandicoots (*Isoodon macrourus*), and echidnas (*Tachyglossus aculeatus*).

HISTORICAL ASSOCIATIONS

EUROPEAN. For the most part, the dune field has been minimally modified by European activity. In the 1880s, Harry Aldridge grazed cattle and horses in the area (Williams, 1982: 83-86),

while Isaac Owens (1975) reported cattle grazing in the 1930s. From the 1940s through to the 1960s, mineral sand prospecting in the form of bores took place across the dune field (Connah, 1948; Mineral Sands Syndicate, 1950; Murphyores Incorporated Pty. Ltd, 1966a, 1966b). For the last few decades, commercial fishing operators have netted mullet and tailor off Corroboree Beach during winter and in some cases established small base camps on the edge of the dune field. In more recent times, tourist campers have used the area, with most activity focused upon a semi-formal camping area located at the northern end of the dune field in the shelter of Indian Head. The most obvious recent human impact to the dune field is 4WD vehicles which gain access by a back track which runs along the back of the foredunes.

ABORIGINAL. European records of 19th century Fraser Island Aboriginal social organisation show little convergence in the area of 'tribal' arrangements. Escaped convict David Bracewell noted that the Islanders went under the general appellation of the Battellas (Simpson, 1842) or Baltelus (cited in Langevad, 1979:1). Anthropologist John Mathew records that Fraser Island was the approximate habitat of the Patyala community (1910:

129-130, 146). Local pastoralist and amateur ethnologist Harry Aldridge listed five 'tribes' for the Island. Significantly, he noted that one of these groups, the Gilambabura, resided in the Indian Head area (Howitt, 1904: 56, 59). Tindale (1974), following the testimony of Gaiarbau (an elder of the Jinibara people of SE Queensland), divided Fraser Island equally into three 'tribes' with Corroboree Beach within northern Ngulungbara territory.

In recent times, Fraser Island Aboriginal people have maintained that their Island was the domain of



FIG. 5. Windandera from Fraser Island wearing a (baler?) shell pendant (courtesy of John Oxley Library).

a single 'tribe' referred to variously as the Butchulla (Reeves and Miller, 1964; see also Miller, 1993), Butchowla (Owens, 1975) or Badtjala (Foley, 1994).

Although numerous observations were made of 19th century Aboriginal activity on Fraser Island (Curtis, 1838; Devitt, 1979; Lauer, 1977), few specific recordings were made for the Corroboree Beach area. James Cook sailed past on May 20, 1770 and made the first known written

record of the Islanders when he noted, 'Winds Southerly, Gentle breezes. At 10 p.m. we passed, at a distance of 4 miles, having 17 fathoms, a black bluff head or point of land, on which a number of the Natives were Assembled, which occasioned my naming it Indian Head ...' (Wharton, 1893).

When Matthew Flinders sailed past Corroboree Beach on July 27, 1802, he made no mention of Aboriginal activity. However, an engraving of the coast between Middle Rocks and Waddy Point which appeared in the published account of his voyage depicted smoke, probably from an Aboriginal camp (Flinders, 1814:Pl. XVIII). Over three decades later, castaways from the *Stirling Castle* similarly failed to make specific mention of Aboriginal people in the Indian Head region (Alexander, 1971; Curtis, 1838). However, on October 4, 1859, Captain R. Arnold reported a 'party of blacks' at a point 'six or seven miles' south of what appears to have been Indian Head while searching for castaways from the *Sea-Belle* which sank off the Queensland coast nearly two years earlier (Skinner, 1974). This observation represented the last recording

of Aboriginal activity in the study area for over a century.

In 1975, local Aboriginal identity Isaac 'Ike' Owens presented evidence to the Fraser Island Environmental Inquiry on his recollections of early Aboriginal activities along the east coast of Fraser Island. He noted, 'My first visit to Waddy Point and Indian Head was in 1932/33. I was employed by George McLiver and Wyn Bagnell

TABLE 1. Radiocarbon dates from Corroboree Beach shell middens. Calibrations taken from Ulm & Hall (1996:60)

Site number	C-14 age	Lab number	Material	Reference	Calibrated ages (2 sigma range)
796/54	1835±85	Beta-1701	shell	Kelly 1982:140	1,562 (1,356) 1,214
	1965±100	Beta-1700	shell	Kelly 1982:140	1,767 (1,513) 1,287
799/54	1270±80	Beta-1699	shell	Kelly 1982:141	970 (797) 649

mustering cattle and horses in that area' (Owens, 1975).

Significantly, Owens also made comments on shell middens near Indian Head: 'One or two miles off the beach were the feasting places of the native people and many mounds were to be seen in feasting areas. Also ceremonial and bora rings were seen' (Owens, 1975).

The study area continues to have significance for Fraser Island Aboriginal people as part of their ancestral homeland. All Aboriginal archaeological sites on Fraser Island are considered to have high social significance for local Aboriginal people (Foley, 1994; Mrs Olga Miller, 'Butchulla' elder, pers. comm. 1993). These sites represent physical evidence of past Aboriginal occupation and use of the Island and as such they are an important signifier of contemporary Aboriginal identity and sense of place. More specifically, Mrs Miller notes that in times past, the 'top of Indian Head was a special place and women and children were permitted only to walk around the base of it' (pers. comm. 1993).

ARCHAEOLOGICAL SURVEY RESULTS

LAUER (1976/77). In the mid-1970s, Peter Lauer (Anthropology Museum, The University of Queensland) initiated the first archaeological research project on Fraser Island (Lauer, 1977, 1979). The major field component of Lauer's research was a survey along the Island's east coast where 152 shell middens were recorded. Of significance to this study is the recording of 26 middens across the Corroboree Beach dune field (Fig. 3). Although Lauer made no mention of the range of faunal remains within Corroboree Beach sites, he summarised the faunal content of east coast middens generally thus: 'All middens are exclusively composed of eugaries [wongs] (*Plebidonax deltoides*), and only occasionally remnants of what appear to be badly battered nautilus shells are present which presumably were washed ashore. Despite intensive searching no remains of any other aquatic animals, such as fish could be located within the middens' (Lauer, 1979: 33).

Stone artefact types identified and 'recovered' by Lauer (1979:39-40) from Corroboree Beach middens were adzes, anvil stones, axes, burins/gravers, choppers, hammerstones, knives, millstones, mullers, points, polish/smoothing stones, scrapers, pebblescrapers, whetstones and cores. Unfortunately, no defining attributes were provided for these identified types. The only other artefacts mentioned by Lauer from Corroboree Beach are two clay pipes (1979: 33-34; Kelly, 1982: 141).

Three radiocarbon age estimates were obtained by Lauer on wong shells from two middens at Corroboree Beach. The top and bottom of a 12cm-thick shell layer at Site 796/54 produced calibrated ages of 1,356BP (years before present) and 1,513BP respectively, while surface (wong) shell from Site 799/54 produced a calibrated age of 797BP (Table 1).

1993 RE-SURVEY. A three day reconnaissance survey established that many parts of the dune field exhibited concentrations of cultural remains amongst a low background scatter of similar remains. For management purposes, concentrations of cultural remains were isolated and

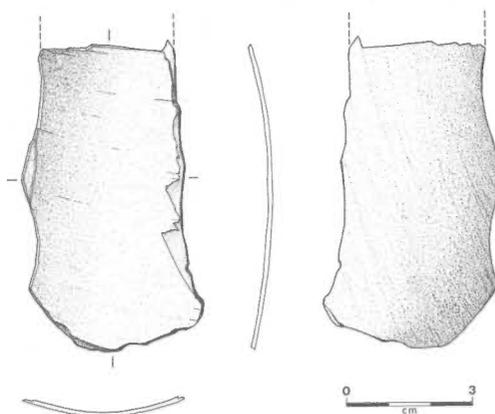


FIG. 6. Baler shell pendant broken during manufacture from a Fraser Island shell midden.



FIG. 7. Bird carcass on Site 85. Scale in 1cm & 5cm units.

assigned site numbers so individual management guidelines could be developed and targeted to particular points on the landscape. As a result, a site was defined simply as a concentration of cultural remains with less than approximately 10m between individual items. While this loose definition often resulted in isolated cultural remains between sites, it encompassed most visible archaeological remains and proved adequate for management purposes.

The entire dune field was surveyed in 24 days by Clinton Johnson (Thoorgine Education and Cultural Centre) and myself. It involved systematic E-W trending transects walked by an individual crew member who searched for cultural remains up to 7m to the right and left. The total length of all transects was 85km. Ground visibility for nearly all of the dune field was over 95%. Site details were recorded using a specially designed seven page recording form, and site boundaries were marked onto enlarged aerial photographs. Shell taxon and artefact raw material frequencies represent estimates only, as time constraints prevented detailed sampling.

Sites. One hundred sites were recorded across the study area producing a mean density of 56 sites/km² (Fig. 3). All sites were shell middens except for a single stone artefact scatter. Only one midden did not contain stone artefacts while 71 middens exhibited animal bones. Sites ranged in size from 270m x 120m (Site 85) to 5m x 2m (Site 83). Mean site length (longest dimension) was 86m and mean site width (maximum dimension perpendicular to length) was 37m. All sites exhibited surface scatters of cultural remains with only

17 sites also revealing in-situ shell layers, usually around 5cm in thickness. Significantly, only six (8%) of the 73 sites within the northern half of the dune field exhibited in-situ remains whereas 11 (41%) of the 27 southern sites exhibited such remains. This pattern suggests that southern sites are less disturbed than northern sites given that the absence of in-situ deposits appears to indicate massive wind erosion and complete deflation of in-situ midden deposits. Furthermore, this pattern is consistent with the wedge shape of the dune field with the widest point at the north indicative of long-term wind erosion and dune movement.

Comparisons with Lauer. The recording of 100 sites from across the Corroboree Beach dune field contrasts with Lauer's survey results from the 1970s where only 26 sites were recorded. Comparison of site distribution maps in Fig. 3 reveals that the greatest discrepancy between the two occurs across the northern parts of the dune field. Possible reasons for the dramatic increase in site numbers are 1. differences in site definition, 2. changes in site exposure, and 3. differences in survey coverage. While it is likely that differences in site definition existed between the two surveys, such differences could not account for the dramatic increase in sites across the northern sections of the study area. Insight into the question of differential exposure of sites between the 1970s and 1993 was gained by examination of sand movements using aerial photographs taken in 1948, 1974 and 1990. The inland extent of mobilised sand (high sand dunes) can be used as an index of wind erosion for areas further east towards the beach (deflation zone and foredunes) as their inland migration is conditional upon the addition of sands blown in from these eastern areas. Fig. 4 shows that while much erosion has taken place since 1948 only moderate changes are evident in the critical period between 1974 and 1990. This suggests, therefore, that many of the northern sites recorded during this survey were present when Lauer conducted his survey. It appears that Lauer concentrated his survey efforts on larger and more visually spectacular shell middens located towards the southern end of the dune field.

The massive effects of wind erosion on the form and exposure of Corroboree Beach middens

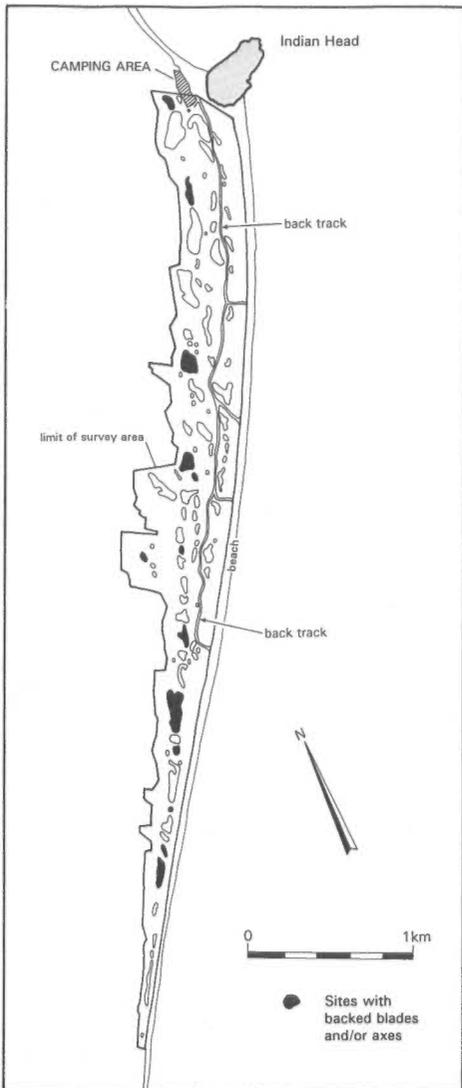


FIG. 8. Corroboree Beach sites with ground-edge axes and/or backed blades.

was recognised by Lauer (1979: 33) who states 'The greatest destruction of middens by natural agents has without doubt affected those sites south of Indian Head. There, I witnessed over a span of one year the final stage of collapse of such a midden. When first recorded its uppermost remnant 10cm layer of eugaries [wongs], measuring 1.5m in diameter was perched on top of a 1.8m high truncated sand cone. In the following year this cone had been entirely flattened'.

This study corroborates Lauer's wind erosion observations as wind erosion continues to be the single greatest agency of site destruction within the Corroboree Beach dune field. The main type of wind erosion on sites is sandblow formation. Southeasterly winds coming off the ocean gouge out SE-NW trending basins in dunes exposing and deflating subsurface cultural materials.

Shells. A total of 12 different shell types (taxa) was recorded on middens. Wongs (*Donax deltoides*) dominate, representing >90% of shell assemblages on 87 middens. Thaidis (*Thais orbita*) were found on 65 sites. Five of the six sites with thaidis comprising 50% or more of shell assemblages were located within 1km of the nearest potential source at Indian Head. Although sand snails (*Polinices incei*) were found on 34 sites they usually made up < 5% of assemblages. Remaining shell types occurred on < 25% of sites and represented for the most part < 1% of shell assemblages. They include helmets (*Phalium* sp.), balers (*Melo* sp.), cockles (*Anadara* sp.), nautilus (*Nautilus pompilius*), oysters (*Ostrea* sp., *Crasostrea* sp.), club whelks (*Pyrazus ebeninus*) tuns (*Tonna* sp.), cockles (Cardiidae), and scallops (Pectinidae).

The Aboriginal origin of certain classes of shells on some middens is questionable. For example, three lines of evidence indicate that numerous shells on foredune middens were deposited through wave action. First, many of these sites contain shells with remnant colouring indicative of recent age. In marked contrast, nearly all shells observed across the deflation zone and high coastal dunes were bleached white and appeared much older. Second, a high proportion of foredune sites contain nautilus, helmets, balers, cockles and tuns and other marine faunas (e.g., cuttlefish) which commonly wash onto the eastern beaches of Fraser Island. The relative proportion of sites exhibiting at least one of these known beach shells drops markedly from 70% of foredune sites to 30% and 19% of deflation zone and high coastal dune sites respectively. Third, light bulbs/tubes were one of the many classes of rubbish recorded on the surface of sites at Corroboree Beach (see below). These light fittings are extremely buoyant and are a common item of beach debris along the east coast of Fraser Island (Langusch & Peterson, 1977). Light bulbs/tubes provide corroborative evidence of wave impact upon foredune sites given that 12 of the 14 sites recorded with these items were located within 200m of the HWM.

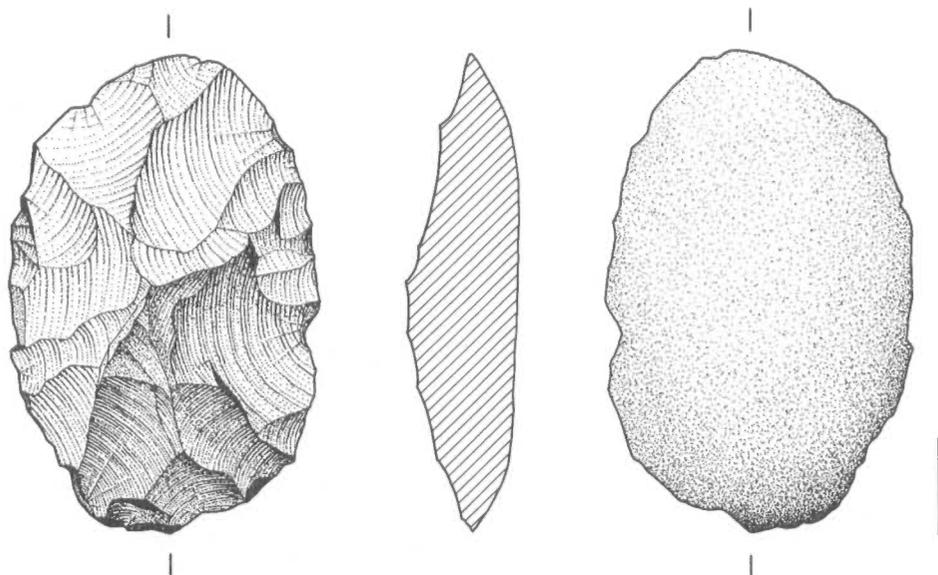


FIG. 9. Small unifacial pebble core from Corroboree Beach. Scale bar = 1 cm. (Queensland Museum QE 21672).

The wave action hypothesis does not negate Aboriginal use of some beach shells for artefacts. Historical records document the use of nautilus shell and baler shell oval-shaped pendants on Fraser Island and at Cooloola (McNiven, 1992b; Steele, 1983: 193) (Fig. 5). Significantly, the remains of a baler shell pendant broken during manufacture have been recorded on a midden at Middle Rocks immediately north of Corroboree Beach (McNiven, 1993b). The pendant has been roughly-shaped by flaking and clearly broke in half before final edge smoothing by grinding would have taken place (Fig. 6). Although shell pendants provenanced to Fraser Island are housed in the South Australian Museum (Fiona Foley, pers. comm. 1995), the Middle Rocks pendant is the first archaeological example recovered from the Great Sandy Region.

Comparisons with Lauer. The recording of 12 shell taxa contrasts markedly with Lauer's reporting of only wongs and nautilus shells on east coast middens. It is apparent that Lauer simply did not report the diversity of shell types seen on middens along the east coast of the Island. Fraser Island Aboriginal people clearly exploited a range of shellfish from the east coast with menus most diverse near headlands where rocky platform species could be enjoyed.

Animal Bones. The skeletal remains of at least nine different animal taxa were recorded across the study area. Bird bones were observed on 42 middens and were the most common vertebrate remains in terms of site occurrence. Next in occurrence were the bones of ungulates (27 sites), fish (22 sites), frogs/toads (14 sites), snakes (10 sites), dingos (2 sites) and macropods (2 sites).

Most bones on middens could represent remains of past Aboriginal meals given they come from edible species. However, evidence for natural deposition of bones on middens was observed across the dune field. The articulated and partly fleshed remains of fishes, snakes, birds, and frogs/toads were recorded on a number of sites (Fig. 7). These remains were deposited immediately prior to recording and clearly have no cultural associations with sites. As such, the role played by Aboriginal people in the discard of other vertebrate remains on middens is open to question and further research.

Few data are available on the range of natural agencies responsible for bone deposition on middens. It is noted, however, that snakes and frogs/toads occur naturally within the dune field and may enter midden deposits simply by on-site deaths. In contrast, carnivores may have been responsible for bird and fish bone discard on

TABLE 2. Occurrence of stone artefact types on Corroboree Beach sites

Artefact Type	No. of sites	Implement Type	No. of sites
flakes	92	axes	7
retouched flakes	36	grindstones	2
beach pebble cores	81	anvils	2
cores (other)	55	bevel-edged tools	3
manuports (beach pebbles)	90	hammerstones	2
manuports (trachyte)	95	backed blades	7
manuports (other)	35	eloueras	1

middens. Eight sites exhibited bird remains with soft tissue and some of these remains exhibited raptor damage in the form of head, neck and viscera removal (Fig. 7). Similarly, fish remains on middens can indicate transportation by either raptors or dingoes. For smaller fish bones, deposition may have been via dingo scats, given recent dingo scats containing fish bones were noted during the survey.

Bones from horse, cattle and sheep were found across the survey area. These remains can be divided into two groups: 1, whole bones; and 2, bones with saw marks. Most whole bones were limbs of either cattle or horses. While some ungulate bones may represent the remains of 19th century Aboriginal meals, parsimony would indicate that most, if not all, represent the natural deaths of late 19th/early 20th century stock animals and more recent feral horses. In contrast, the isolated occurrence of sawn T-bone steak and lamb chop bones on middens suggests the activities of dingoes scavenging rubbish from recent and nearby tourist camp sites.

Comparisons with Lauer.

Lauer (1977:34) noted that the only bones observed on east coast middens were 'some skeletal remains of recently deceased birds'. While a much greater diversity of faunal remains was recorded during this study, Lauer's comments concur with inferences made about birds on Corroboree Beach middens during this study. Clearly, further detailed taphonomic studies are required on middens before reliable inferences can be made on past Aboriginal vertebrate procurement activities.

Stone Artefacts. Stone artefacts were numerous with nearly two-thirds of sites exhibiting numbers of at least 100. However, because of the large size of many sites the mean density of surface artefacts on 85% of sites was less than $1/m^2$. Only two sites exhibited maximum densities of greater than $100/m^2$. Over 80% of sites contained flakes, beach pebble cores, unmodified beach pebbles (manuports) and trachyte manuports, while a third of sites exhibited retouched flakes (Table 2).

Very few sites contained formal implement types (Table 2). The two most common implement types were ground-edge axes and backed blades (geometric microliths and bondi points). An interesting bias existed for the location of these two implement types to sites on the western margins of the dune field (Fig. 8). Such patterning most likely reflects functional differences between eastern and western midden sites. Furthermore, these functional differences may have some chronological basis that represent different cultural phases and different land-use patterns.

At least 13 raw materials were recorded for the manufacture of stone artefacts. Twelve of these are natural and one is European bottle glass. In terms of site frequency, the most significant raw materials were locally available trachyte (97 sites) and quartz/quartzite (96 sites) followed by 'exotic' chert (72 sites) and silcrete (70 sites) (Table 3). Raw materials known to be available on Fraser Island are quartz, quartz/quartzite, trachyte, ferruginous sandstone and basalt. Sections of rounded, cortical surfaces seen on most quartz and quartz/quartzite artefacts indicates manufacture from small, water-worn pebbles identical to



FIG. 10. Small pebble core tool with massive use-wear from Corroboree Beach. Scalebar in Imm units.

TABLE 3. Relative occurrence of stone artefact raw materials on Corroboree Beach sites.

Raw material occurrence on site (%)	Raw material (no. of sites)												
	Trachyte	Quartz/Quartzite	Chert	Silcrete	Volcanic (other)	Sandstone (other)	Ferrug. sandstone	Quartz	Glass	Basalt	Mudstone	Andesite	Chalcedony
0-<1	1	4	48	38	44	33	34	5	5	5	2	1	1
1-<10	8	22	14	21	4	8	4	1	1				
10-<20	5	15	4	6		3		4					
20-<30	6	14	1	2				1					
30-<40	5	5	3	2	1			1					
40-<50	7	8		1									
50-<60	11	6	1		1								
60-<70	5	1											
70-<80	13	7											
80-<90	12	7											
90-100	24	7	1										
Total	97	96	72	70	50	44	38	12	6	5	2	1	1

those currently available on the adjacent beach (Fig. 9). While the frosted, water-worn cortex on unmodified pebbles (manuports) precluded identification beyond quartz/quartzite, most flaked pebbles revealed a micro-crystalline structure consistent with quartz. The nearest potential raw material source for trachyte artefacts is Indian Head. Water-worn cortex on many trachyte artefacts indicates exploitation of cobbles from the inter-tidal zone. Ferruginous sandstone artefacts were most likely manufactured from local out-

croppings across the western sections of the dune field. Basalt artefacts may have been obtained from a basalt quarry site recorded at Waddy Point. It is possible also that most 'other' volcanic artefacts were quarried locally as they resemble some of the grey fine-grained volcanics observed at Waddy Point. Many of the 'other' sandstone artefacts may have been obtained locally as many are identical to a yellowish-white sandstone which washes up in small lumps along Corroboree Beach.

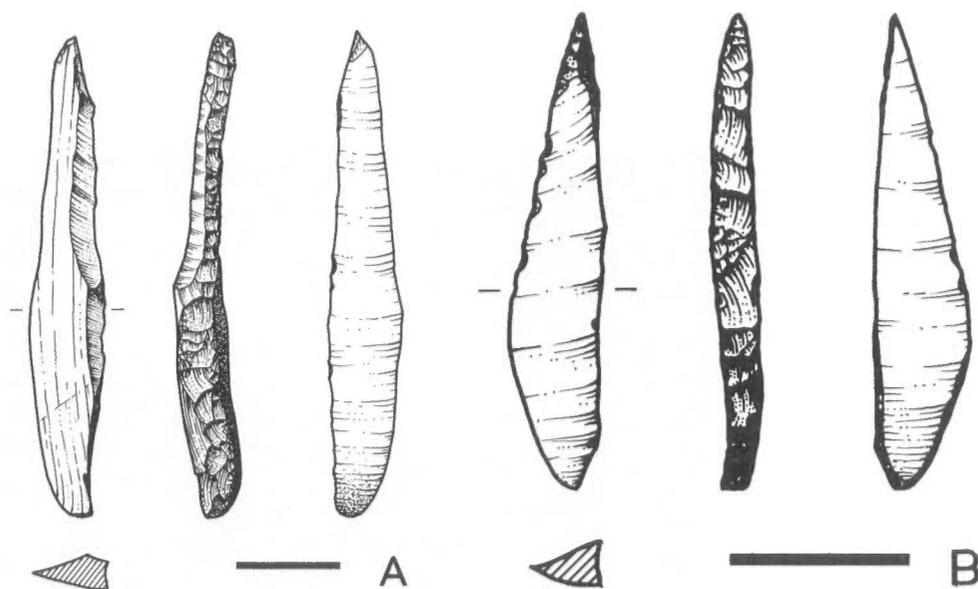


FIG. 11. Chert backed blades from Corroboree Beach. (A. Site 91, B. Site 57, scalebar = 1cm).

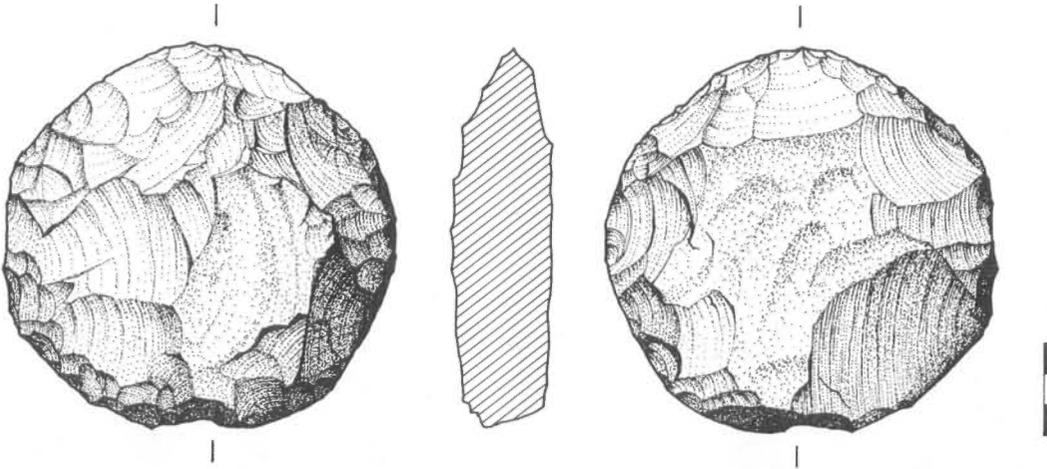


FIG. 12. Trachyte discoidal core from central east coast of Fraser Island. Scalebar in cm units. (Queensland Museum QE 10403).

The nearest potential source of mudstone and some of the cherts is Big Woody Island located 46km southwest of Corroboree Beach between Fraser Island and the mainland (Lauer, 1979:68). The single andesite cobble (Site 29) is visually identical to andesite cobbles observed around the base of Double Island Point located on the Cooloola mainland, 100km to the south. Silcrete and many of the cherts with a vitreous lustre have no known local sources and clearly originate from the mainland at least 50km distant.

Significant correlations exist between raw materials and formal implement types. All quartz and quartz/quartzite artefacts were either flakes, cores or manuports. A number of pebble cores, however, exhibited massive use-wear (edge-rounding) along a single edge consistent with intensive use as some form of scraping tool (Fig. 10). The manufacture of all backed blades from high quality chert appears to relate to the technological requirements of a high quality raw material for high precision flaking (Fig. 11). The most distinctive artefact form produced from trachyte, basalt, 'other' volcanic and ferruginous sandstone was a range of palm-sized, disc-shaped, bifacially flaked implements which could be included within the broad category of discoidal cores. For trachyte and ferruginous sandstone discoidal cores, flaking extended around the entire perimeter of the artefact, often producing a symmetrical, oval-shaped implement (Fig. 12). Most basalt and 'other' volcanic discoidal cores

exhibited a ground-edge and are clearly axes (Fig. 13).

Comparisons with Lauer. In many respects comparisons are limited by differences in the form and presentation of stone artefact data in this study and Lauer's study. For example, Lauer (1979:70) does not distinguish coastal middens from inland sandblow sites in his raw material data tables. In terms of artefacts types, Lauer's data is restricted to broad functional types which are no longer used by Australian archaeologists. Categories such as 'scraper', 'knife', and 'chopper' tend to be used only if microscopic examination reveals use-wear consistent with such functions. Despite these major limitations, a number of useful observations can be made. First, Lauer identified axes on 10 of the 26 sites he recorded which is far greater than the 7 out of 100 sites recorded with axes during this survey. While it is possible that different axe definitions may have been employed by each study, it is more likely that more axes were present when Lauer conducted his surveys 20 years ago. The simplest explanation for changes in axe occurrence is removal by collectors. Second, the identification of pebble cores with massive use-wear provides the first direct evidence confirming Lauer's (1979: 65-67) suggestion that many pebble cores were used as tools ('pebblescrapers') (cf. McNiven & Hiscock, 1988: 164-165). Third, the discrete flaking found around the edges of many ferruginous sandstone discoidal

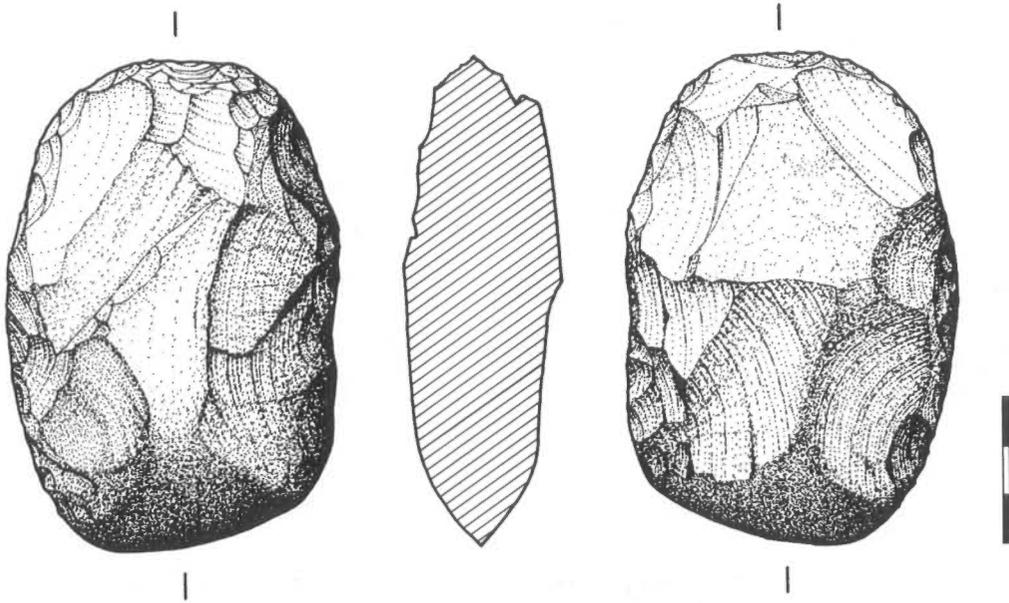


FIG. 13. Basalt ground-edge axe from Corroboree Beach collected by B. Bagnall in 1950. Scale bar in cm. (The University of Queensland, Anthropology Museum # 5466).

cores suggests that they were manufactured as a tool to perform some form of chopping/pounding activity. This functional inference is consistent with Lauer's (1979: 66-67) description of these artefacts as 'discoïd choppers'. Fourth, Lauer (1977, 1979) makes no mention of bevel-edged tools — a distinctive wedge-shaped, hand-held tool that was once used by Aboriginal people across coastal southeast Queensland for processing plant foods (McNiven, 1992c). The recording of bevel-edged tools on three sites at Corroboree Beach extends the known distribution of this artefact type (Fig. 14).

Glass Artefacts. Six sites contained fragments of glass consistent with having been flaked by Aboriginal people. Most glass flakes exhibited a well-formed ventral surface with prior flake detachments across the dorsal surface indicative of controlled and purposeful flaking by humans (as opposed to hoof damage from cattle and horses). Similarly, all artefacts consist of thick, dark green glass with bubble voids identical to bottle glass dating to either the late 19th century or early 20th century.

The recovery of flaked glass artefacts is consistent with finds from middens along other sections

of the island's east coast (McNiven, 1994b; see also Colliver, 1968: 60 and Lauer, 1979: 69). As with the Corroboree Beach examples, southern examples were manufactured from dark green bottle glass which in one case was identified as a Dutch gin bottle manufactured by A. van Hoboken and Co. of Rotterdam between 1860 and 1880 (Fig. 15). Bottles for artefact manufacture may have been obtained from the Sandy Cape lighthouse (e.g. domestic dump) and/or the beach (washed up from passing sailing ships).

Clay Pipe. A white clay pipe was recovered from the surface of Site 14 (Fig. 16). The outer surface of the bowl is decorated with two rows of raised parallel ridges. Damage to the pipe includes flaking around the bowl aperture, general sandblasting, and a sandblasted hole near the base of the bowl. The pipe is of Scottish manufacture and dates to the mid-to-late 19th century (Courtney & McNiven, in press). The pipe appears to have been used and discarded by Aboriginal people following acquisition from early European colonists on the Island.

Comparisons with Lauer. The finding of a clay pipe follows the recovery of two clay pipes from Corroboree Beach by Lauer (1979: 33-34). Al-

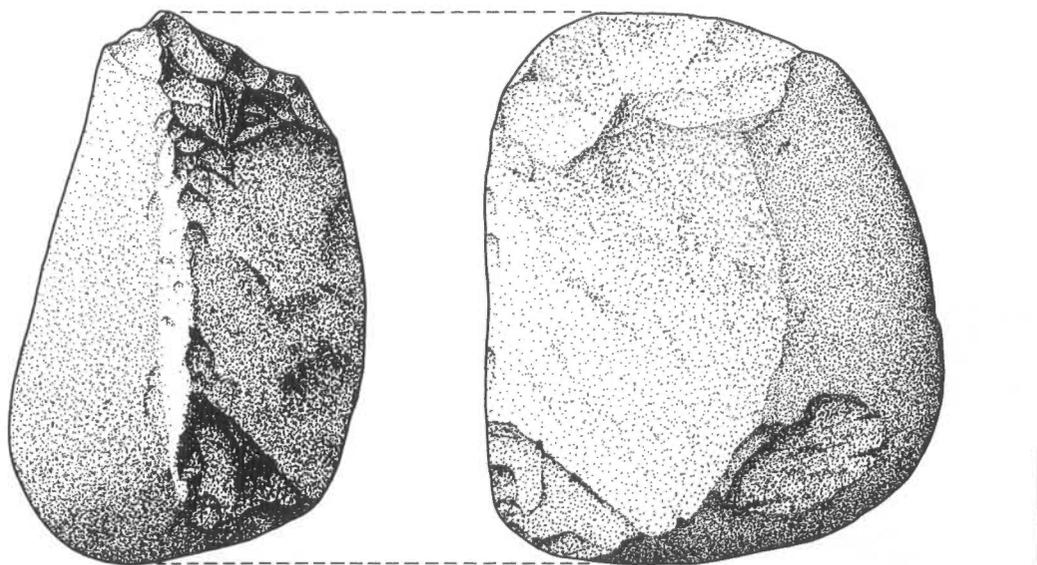


FIG. 14. Trachyte bevel-edged tool from Corroboree Beach. Scalebar in cm units.

though the decorative designs on all three pipes differ, all appear to date to the mid- to -late 19th century (Courtney & McNiven, in press). No data are available to support Sinclair's (1990: 68, 74) contention that the pipes represent 17th century Dutch trade items and pre-1770 European exploration of Fraser Island.

Antiquity of remains. Insights into the antiquity of pre-European contact Aboriginal archaeological remains are limited to Lauer's three radiocarbon dates which ranged from ca.800-1,500 calBP. Despite this limitation, a number of hypothetical suggestions can be made about the potential age of remains. In terms of the earliest evidence for occupation, insight is provided by backed blades. Recent research on the adjacent mainland at Cooloola (McNiven, 1992d) and Booral (Frankland, 1990) has revealed evidence for use of backed blades by Aboriginal people in the Great Sandy Region between 2,300 and 3,800 years ago. As such, the Corroboree Beach backed blades may have a similar antiquity, suggesting use of the dune field may extend back 3,000-4,000 years.

Archaeological evidence for Aboriginal occupation of Corroboree Beach during the last 800 years is limited to flaked bottle glass artefacts and clay pipes. These cultural remains establish that

Aboriginal people were still using the Corroboree Beach area during the late 19th and possibly early 20th centuries. This archaeological evidence links in with oral information on Aboriginal activity in the area earlier this century (e.g., Owens, 1975).

Recent human use of Corroboree Beach - tourist impacts. Characterising the form of archaeological sites at Corroboree Beach entails more than an understanding of natural taphonomic agencies

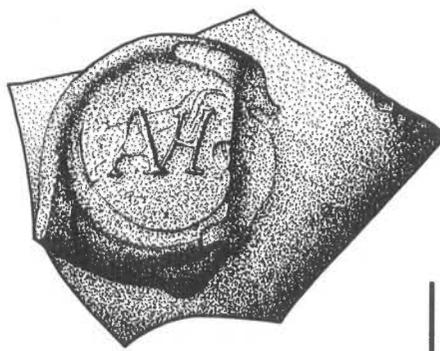


FIG. 15. Fragment of a Dutch gin bottle used as a tool from a shell midden located on the central east coast of Fraser Island. Scalebar = 1cm.

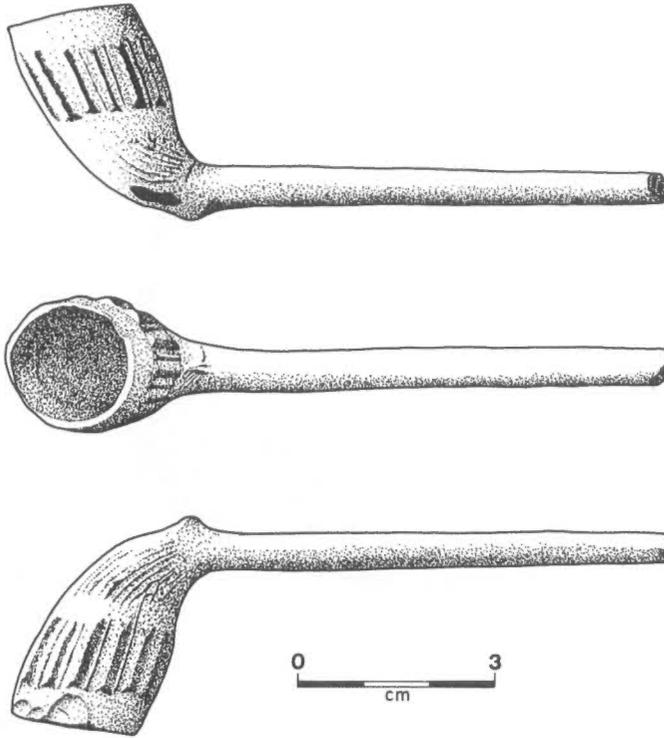


FIG. 16. Clay pipe recorded on a midden at Corroboree Beach.

over the last few thousand years. The last 20 years has seen a major increase in human use of the Corroboree Beach area corresponding to the ten-fold increase in tourist visitation to Fraser Island from 20,000 people in 1975 to nearly 250,000 people in 1990 (The Commission, 1990a: 66, 76). Tourist activity in the form of vehicle tracks, foot tracks and rubbish has had a major impact upon the form and preservation of Aboriginal sites at Corroboree Beach.

Vehicle tracks were recorded on 33 sites. Most ($n=27$) of these sites were located across the northern half of the dune field within 2.5km of Indian Head (Fig. 17). It is apparent that the northern focus of vehicle disturbance is primarily a function of access afforded by what is referred to locally as the 'back track'. However, secondary factors are also influencing driver habits, as relatively more sites were recorded with vehicle damage towards the northern sections of the track. It appears that proximity to the Indian Head camping area and the large open pans which are a feature of the northern deflation zone

lure drivers off the 'back track' to test their off-road driving skills.

Major damage occurs to sites traversed by vehicles. Tyre tracks crush shells and stone artefacts in addition to destroying the stratigraphic integrity of cultural remains. In terms of overall dune disturbance, vehicles are a major destabilising factor, causing damage to fragile plant ground cover which exposes sediments to subsequent wind erosion.

Ten sites exhibited human foot/shoe prints. Most ($n=9$) were located across the northern 1km of the dune field (Fig. 18) suggesting that foot tracks on sites belong to people using the Indian Head camping ground. The impact of prints on sites ranges from minor to moderate depending on frequency of occurrence. In all cases, individual prints have the potential to crush and move cultural remains.

Most (80%) sites contained items of 'European' rubbish. The most common items were manufactured from steel (64 sites), glass (56 sites) and plastic/rubber (40 sites). Most metal items were

beer cans (38 sites) (Fig. 19) followed by a range of small items such as ring-pull lids from drink cans, bottle caps, tent pegs, wire, nails, lead fishing sinkers, food tins, and batteries. Nearly all glass items were whole or broken bottles. Other glass items included light bulbs/tubes and food jars. Plastic/rubber items were dominated by containers in addition to rope, fishing line, thongs, cloths pegs and even a golf ball. Only wood items exhibiting axe or saw marks were recorded. Most were survey pegs from mineral sand prospecting. The only ceramic items observed were clay bricks. Paper rubbish was dominated by toilet paper with most located on sites around the Indian Head camping area.

Rubbish items *per se* tend to cause only minor disturbance to sites. Although the weathering of plastics can liberate certain toxic elements into sediments and alter dune chemistry (Langusch & Petersen, 1977: 243-248), overall the main adverse impact of rubbish is visual pollution. However, rubbish entering sites directly by human discard will be associated with mechanical dam-

age to sites stemming from treadage and camp construction. Also, rubbish on sites can downgrade people's attitude towards archaeological remains as heritage sites, engendering disrespect and possibly encouraging further littering.

THE ARCHAEOLOGICAL VALUE OF CORROBOREE BEACH

The dune field contains the largest concentration of Aboriginal sites known from the entire Great Sandy Region. As such, it represents one of the largest Aboriginal site complexes recorded in southern coastal Queensland. Two immediate questions arise from this re-characterisation and description. Why was Corroboree Beach an important focus for past Aboriginal activity and what will be the future of this site complex?

Previous archaeological research on Fraser Island has pointed to the importance of the coast to past Aboriginal lifeways. Devitt (1979: 90) hypothesised that marine protein foods (fish and shellfish) were 'the primary focus of subsistence activities' with terrestrial plant foods (especially fern roots and cycad nuts) 'providing the necessary dietary balance'. Furthermore, the strategy which people chose as the optimal settlement pattern to exploit these resources was 'regular movement' between base camps established along the eastern and western coastlines coupled with inland foraging trips (Devitt, 1979: 95).

Recent analysis of Aboriginal settlement activity along the east coast of the Island has shown that the central third of the coast between Hook Point and Indian Head, which parallels the distribution of rainforest down the middle of the Island, was an important focus of past activity (McNiven, 1994b; in press). This pattern was attributed largely to changes in social organisation during the last 1500 years which saw the development of rainforest foods as important in conditioning the placement of camps along the adjacent east coast. However, this model does not account for the (other) major focus of camp activity seen at Corroboree Beach where no inland rainforest resources exist.

It is hypothesised that Corroboree Beach may have attracted Aboriginal people taking advantage of its fishing opportunities. More specifically, the waters between Indian Head and Waddy Point are one of the most important spawning locations for tailor along the Australian east coast (Morton & Healy, 1992: 19). The bounty of tailor around Indian Head is demonstrated well by the tens of thousands of modern day anglers who converge on the area each year:

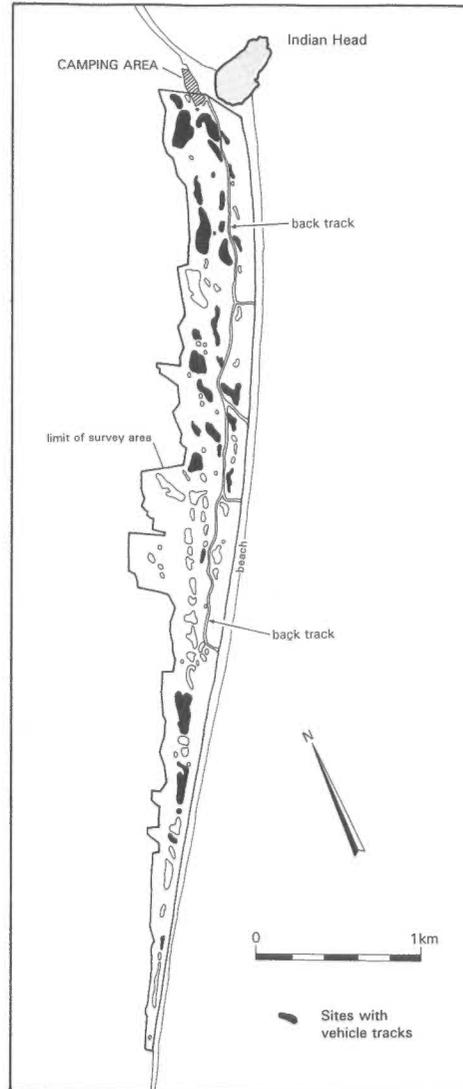


FIG. 17. Sites with vehicle track disturbance at Corroboree Beach.

one 'fishing expo' alone attracts 3,000 anglers (Hunt, 1993).

The fishing hypothesis conforms to historical records of 19th century Aboriginal activity along eastern Fraser Island. Olga Miller (cited in The Commission, 1990b: 118) noted that the east coast of Fraser Island was an important inter-regional gathering area for the 'Feast of the Tailor'. The scale of these gatherings is indicated

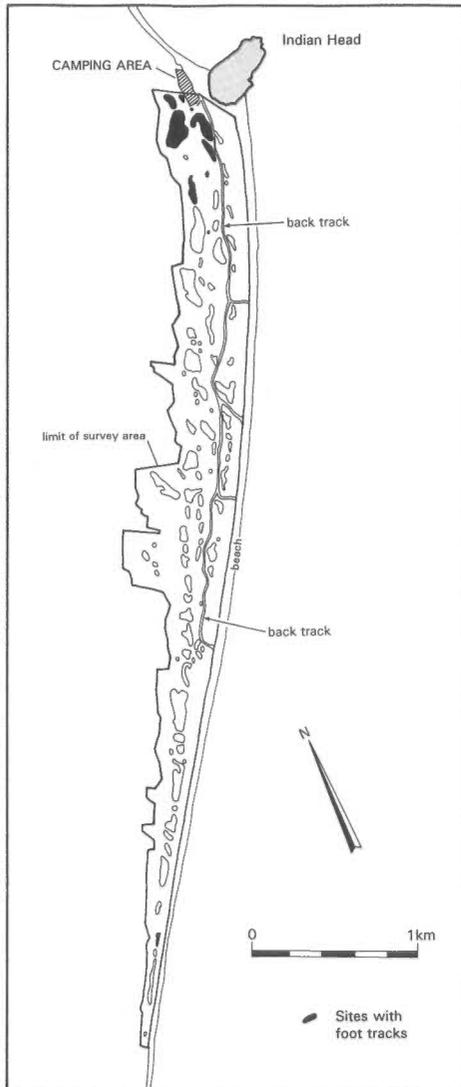


FIG. 18. Sites with human foot/shoe prints at Corroboree Beach.

by escaped convict David Bracewell who reported that 'at their great fights he has seen them covering the Beach for four miles in extent' (Simpson, 1842). It is noteworthy that Devitt (1979: 29-31) found that the majority of 19th century European observations of Aboriginal activity on the Island took place in winter and spring, the known period of super-abundances of tailor.

The recording of fish bones on only 20% of middens at Corroboree Beach is not necessarily inconsistent with the fishing hypothesis. Experience from Cooloola to the immediate south of Fraser Island reveals that fish bones are rarely found on the surface of middens. Most fish bones were recovered only from sub-surface midden deposits through careful excavation using fine-mesh sieves (McNiven, 1990). Clearly a need exists for excavation data from Corroboree Beach middens.

It is ironic that fishing, which may have been central to the formation of the extraordinary site complex at Corroboree Beach, has in recent years been responsible for slowly destroying these fragile cultural remains through the actions of tourists. Recommendations from this study for the preservation of Corroboree Beach sites played a key role in decisions by the Queensland Department of Environment and Heritage (now Department of Environment) to prohibit vehicle access to the dune field and to control human visitation by closing the entire area to camping. Furthermore, a midden stabilisation program through re-vegetation of selected dunes was subsequently undertaken by staff of the Queensland Department of Environment and the Thoorgine Education and Cultural Centre.

Understanding and preserving the fragile archaeological record of Corroboree Beach needs to be ongoing. Although the picture of the site complex provided by this study is necessarily static, it is clear that that any archaeological record within a large, active dune field is dynamic and ever changing. Further research on the movement of sands across the dune field and their effects on the exposure and burial of sites needs to be undertaken. More significant, however, is the need for greater archaeological understanding of the range and meaning of the diverse array of fragile Aboriginal cultural remains through excavation of selected sites. Such research will shed light on the significance of Corroboree Beach to Aboriginal people in the past and provide a more informed basis upon which to appreciate the significance of Corroboree Beach in the future.

DYNAMIC CULTURAL HERITAGE MANAGEMENT

Differences in the characterisation of Aboriginal sites at Corroboree Beach revealed by surveys in the 1970s and 1990s are dramatic. Apart from implications for interpretations of past Aboriginal lifeways on Fraser Island, the re-survey results have precipitated a major re-assessment



FIG. 19. Pile of beer cans exposed by wind erosion on Site 95 at Corroboree Beach.

of the cultural heritage significance values of the site complex. Such re-assessments resulted from a more informed understanding of the scale and complexity of archaeological remains. While in some respects these new understandings resulted from the application of a more rigorous and management-based research methodology, the influence of changed environmental circumstances, in particular the movement of sands and the exposure of new cultural remains, was also important. The implications of these new insights for site management are significant in light of dramatic increases in tourist use of the area over the past two decades. However, while the Corroboree Beach study highlights the need for management plans which emphasise *in-situ* site preservation, time will tell whether or not actions such as site stabilisation using vegetation have been successful. If monitoring of *in-situ* management activities reveals serious short-comings, more drastic action such as selective site salvage may be necessary.

The influences of new research methodologies and changing natural and social contexts upon site assessments has important implications for archaeological research and cultural site manage-

ment in general. Clearly, the circumstances in which cultural sites are found can change dramatically within the space of decades or even years. For some time now, Rowland (1989, 1992, 1996) has been arguing that understanding the archaeological record of the Queensland coast is contingent upon a more thorough understanding of its dynamic nature, particularly in terms of the erosional effects of sea-level change, storm surges and cyclones (Bird, 1992). In this case, emphasis has been placed on exploring the implications of site destruction upon interpretations of spatial and chronological patterns in coastal sites and on the need to preserve sites into the future. The Corroboree Beach study demonstrates that erosion may not only disturb sites, it can also reveal new sites and radically expand the visible form of archaeological remains across the landscape.

The need for updated management plans is crucial for areas witnessing changing demographic circumstances such as the popular tourist destinations of Queensland. In this connection, re-surveys of Aboriginal cultural heritage sites in the Central Queensland Highlands (Godwin, 1995; McNiven, 1996; Walsh, 1993) and on coastal dune systems on Moreton Island (Robins,

1984) have produced results which mostly document attrition of sites (Sullivan, 1981). The Corroboree Beach case study emphasises the fact that re-surveys may actually reveal the exact opposite and document dramatic increases in the scale and complexity of cultural remains. The message that is emerging from these re-survey studies is clear. Cultural heritage agencies need to develop more flexible management models which better accommodate the dynamic nature of cultural heritage sites. Critical to this process should be the development of management strategies which place greater emphasis on systematic site monitoring to track potential changes in natural and human activities upon site integrity and exposure. Such a strategy will allow heritage agencies to be more responsive to the changing needs of sites and provide new scope for Aboriginal communities to be more actively involved in the management process.

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