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Tom's Creek Site Complex

Introduction

This chapter reports archaeological investigations at the Tom's Creek Site Complex, located at the confluence of Round Hill Creek and Tom's Creek. It is the only excavated site to the east of Round Hill Creek in this study. Findings are consistent with those from sites to the north, showing repeated deposition of cultural materials from around 1,000 years ago. Like the Ironbark Site Complex, the Tom's Creek Site Complex provides direct evidence for persistence of occupation into the historical period, with flaked bottle glass recovered from the surface of the deposits. Survey and excavation methods are outlined before results of excavations are presented. As the Tom's Creek Site Complex is situated on the same estuary as Eurimbula Site 1, information about general estuary ecology is not repeated here (see Chapter 12).

Site description and setting

The Tom's Creek Site Complex is a large, stratified midden intermittently exposed over low dunes abutting the base of a rhyolitic scree slope at the junction of Round Hill Creek and Tom's Creek (Figs 13.1–13.2). The scree slope is part of a rocky outcrop forming the core of a small peninsula oriented roughly north-south. The site is situated 5km south-southwest of Round Hill Head (Latitude: 24°11'35"S; Longitude: 151°52'21"E). Several low, sandy ridges less than 1m in elevation and exhibiting surface shell are located on extensive mudflats between the mainland and the channel of Round Hill Creek. These stranded residual ridges were almost certainly formed by the movement of the creek channels in the past (Errol Stock, Australian School of Environmental Studies, Griffith University, pers. comm., 2000). The site covers a minimum area of approximately 12,500m², but is thought to be continuous with other deposits recorded to the north (see below). The densest exposures of cultural material occur closest to the coastal fringe.

Shell material is dominated by mud ark (*Anadara trapezia*) and oyster (*Saccostrea glomerata*) with occasional pearl oyster (*Pinctada albina sugillata*). Shell material was also observed on the intertidal flats adjacent to the terrestrial deposits, indicating recent erosion of the site's margins. Stone artefacts manufactured on rhyolitic tuff are commonly associated with the shell deposits as are occasional water-rounded microgranite cobbles, some exhibiting impact-pitting. Close to the base of the scree slope, surveys located a scatter of dark green bottle glass covering an area of c.10m², including several thick base sherds, two retouched artefacts and a large retouched artefact in the fork of a nearby tree.

A limited geomorphological coring program revealed that the low sand ridges abutting the rhyolitic core of the peninsula and adjacent sand ridge residuals on the intertidal flats are underlain by bluish-grey muds and clays, suggesting deposition in an estuarine environment. Preliminary examination indicates that these sediments are rich in organic material and dominated by mangrove pollen and are therefore interpreted as mangrove facies (Maria Cotter, School of Human and Environmental Studies, University of New England, pers. comm., 2000). A working model of local landscape evolution suggests that an expanded mangrove-vegetated intertidal zone extended to the base of the scree slope at a time of higher local sea-level around the mid-Holocene. Falling sea-levels after 4,500 BP mobilised sediments to form the transgressive dunes running parallel to the orientation of the peninsula. Some of these dune ridges were subsequently eroded by changes in the orientation of the channel of Round Hill Creek and the mouth of Tom's Creek.

The entire site area is surrounded by the dense mangroves which fringe Round Hill Creek and Tom's Creek and the minor inlets originating from these major waterways (Fig. 13.1). These mangroves largely protect the site from the direct impact of wave and wind action. Vegetation is dominated by spotted mangroves (*Rhizophora stylosa*) backed by yellow mangroves (*Ceriops tagal*) (Olsen 1980a). The narrow swale between the frontal and secondary dune on the mainland is dominated by teatrees (*Melaleuca* sp.) and tall (>15m) weeping cabbage palms (*Livistona decipiens*), while the area from the secondary dune inland to the base of the scree slope has an open canopy of large eucalypts interspersed with clumps of tall cabbage palms. The understorey is composed of common lantana (*Lantana camara*), immature cabbage palms, ground vines and shrubs. A stand of large (>5m high) cycads (*Cycas megacarpa*) occurs on a rocky slope at the south of the site. Residual landforms on the intertidal flats exhibit tall vegetation rising above the surrounding mangrove canopy, consisting mainly of teatrees and cabbage palms.

Although the general area in which the site is contained has been subject to significant European modification, the actual site area appears to have been minimally impacted by these activities. The main terraforming activities are a gravel quarry across the isthmus of the peninsula to the north of the site and a gravel road terminating at a boat ramp into Tom's Creek, which has been constructed along the eastern margin of the peninsula (Fig. 13.1). Surveys also located a small marijuana (*Cannabis sativa*) plantation concealed in dense lantana on the site itself. Use of plastic planting containers has prevented major impact of these cultivation activities on the archaeological deposits. The Tom's Creek Site Complex area is situated on a Recreation Reserve controlled by the Miriam Vale Shire Council. Tom's Creek is promoted to tourists as an estuarine fishing destination and several local brochures show the 4WD track from Captain Cook Drive to the Tom's Creek boat ramp (e.g. Desert Ridge 1998). Observed shore-based recreational fishing activities, however, are concentrated in the area of the boat ramp and are associated with recent human defecation sites, alcohol bottles and camp fires — well away from the main area of cultural deposits located to the northwest. Occasional flotsam is washed onto the intertidal flats through the mangroves and is sometimes blown onto the archaeological deposits.

Low density Aboriginal cultural materials occur throughout the area enclosed by the Town of Seventeen Seventy in the north, Tom's Creek in the south, Captain Cook Drive in the east and Round Hill Creek in the west (see Figs 12.1 and 13.1). Evidence for major landscape modification is



Figure 13.1 Aerial view of the Tom's Creek Site Complex area (after BPA Run 10B/57, 30 July 1996). The dashed box encloses the approximate area shown in Fig. 13.2. Based on data provided by the Department of Natural Resources and Mines, Queensland 2006, which gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data.

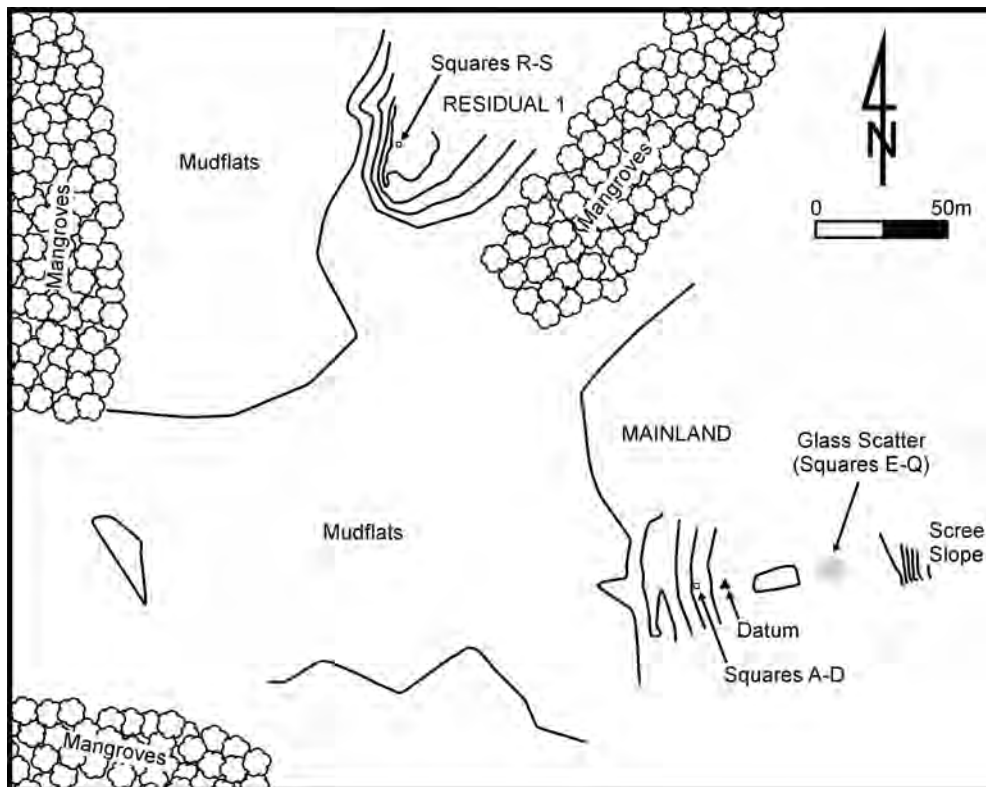


Figure 13.2 Site plan of area of Squares A-S. Contours are in 0.5m intervals.

evident in the northern two-thirds of this area, including quarrying, road-building and vegetation clearing. Numerous disused 4WD tracks also occur in this area. These indicators point to a diminution of the integrity of Aboriginal cultural deposits in this area. Examination of the 1959 aerial photographs show no evidence for quarrying or road-building on the Tom's Creek peninsula. Both the 1964 and 1988 photographs show the same small amount of quarrying at the narrowest part of the peninsula, suggesting that the majority of these activities took place between 1959 and 1964. By 1993 the aerial photograph shows extensive quarrying almost across the width of the peninsula and penetrating to the south. A road from the quarry area to Captain Cook Drive is also clearly visible with its construction probably associated with the more intensive gravel extraction activities occurring between 1964 and 1993.

The site appears to be an extension of the deposits recorded by Burke (1993) as KE:A33 on the Queensland Environmental Protection Agency's (EPA) Indigenous Sites Database. Burke observed very sparse shell scatters on and around 4WD tracks in open woodland, suggesting the area of the gravel boat ramp at Tom's Creek. Rowland (1987) recorded an extensive shell scatter bordering Round Hill Creek as KE:A11 just to the north of the isthmus of the Tom's Creek peninsula. Some of this material was subsequently disturbed by the construction of a large field for a sewage irrigation program that was later abandoned. Stone artefacts manufactured on a range of raw materials and scattered shell is visible across the field, particularly along its northwest margin. Based on findings elsewhere, such diverse lithologies may point to an early chronology for archaeological deposits in this area (see Chapter 14). Burke (1993) subsequently recorded two more middens to the northeast of this area: KE:A62 — a linear stratified midden exposed in a pit behind the sewage treatment depot; and KE:A63 — a sparse midden visible in 4WD tracks in this area (see Figs 12.1 and 13.1).

Intensive pedestrian surveys conducted as part of the Gooreng Gooreng Cultural Heritage Project (GGCHP) demonstrated that all of these deposits are likely to be continuous, with no major disjunctions identified between the sites recorded as KE:A33, KE:A11, KE:A62 and KE:A63 (Fig. 12.1). For the purposes of this site report, however, the Tom's Creek Site Complex is defined as the roughly triangular area bordered by Round Hill Creek and Tom's Creek to the west and south respectively and to the east by the scree slope and ridge that forms the core of the peninsula. To the north the area is truncated by a gravel quarry across the narrowest part of the peninsula. The site definition also includes four residuals exhibiting cultural material which occur on the intertidal flats to the immediate west (Fig. 13.1). The site is recorded as Gooreng Gooreng Cultural Heritage Project Site CC57 and Queensland Museum Scientific Collection Number S230.

Excavation methods

A detailed surface examination of the entire coastal fringe between the junction of Tom's Creek and Round Hill Creek north to the Town of Seventeen Seventy was undertaken before final selection of the areas for excavation (see Fig. 12.1). Surface visibility was usually limited by leaf litter and understorey vegetation away from the creek margin, although residual landforms on the intertidal flats generally exhibited high surface visibility. The three areas selected for excavation and/or systematic surface collection coincided with: (1) the densest exposure of shell material observed on the mainland, located on the frontal slope of the secondary dune (Squares A–D); (2) the densest shell exposure on the residual landforms stranded on the adjacent tidal flats (Squares R–S); and, (3) an area where flaked bottle glass was located (Squares E–Q) (Fig. 13.2). Detailed mapping was undertaken in the immediate vicinity of areas designated for excavation and collection. The large area over which cultural material is distributed prohibited detailed mapping of the entire site area. Excavations were conducted between 6–22 April 1999.

Squares A–D were located in an open, level area exhibiting surface shell and stone artefacts on a secondary dune c.15m east of the edge of the mudflat fringe and c.80m west of the base of the scree slope (Latitude: 24°11'35"S; Longitude: 151°52'21"E) (Figs 13.2–13.3). A site datum was established 384.5cm east of the middle of the east wall of Square B. Excavation proceeded in shallow, arbitrary excavation units averaging 3.8cm in depth and 12.6kg in weight. Excavation ceased at a maximum depth of 90.5cm below ground surface after several units of culturally-sterile sediments had been removed (Fig. 13.6). A total of 94 XUs was removed, distributed as follows: Square A (23 XUs), Square B (24 XUs), Square C (24 XUs), Square D (23 XUs). A total of 1,185.7kg of sediment was excavated. Excavated sediments were gently dry-sieved through 3mm screens onto a plastic tarpaulin located 5m north of the excavation. Stone (n=76), charcoal (n=23), shell (n=8) and bone (n=2) specimens encountered *in situ* during excavation were plotted three-dimensionally. The excavation was backfilled with a layer of plastic sample bags, followed by 50l of mangrove mud from the adjacent fringe and then the material that had passed through the 3mm sieve. A further 50l of mangrove mud was placed at the top (see Chapter 3 for a detailed discussion of the standard excavation methods employed at all sites).

Squares E–Q were situated in a level area c.50m east of Squares A–D and c.20m west of the base of the scree slope (Latitude: 24°11'34"S; Longitude: 151°52'20"E) (Figs 13.2–13.3). A grid was established over an area exhibiting a surface scatter of dark green bottle glass fragments, shell and stone artefacts manufactured on rhyolitic tuff (Fig. 13.4). Surface leaf litter and undergrowth were systematically removed from a c.40m² area around the glass scatter. A large fragment of glass was identified during this clearing operation in the fork of a quinine tree (*Petalostigma pubescens*) c.145cm above the ground (Fig. 13.5). A 2m × 1.5m grid comprising 12 × 50cm × 50cm squares (E–P) was established over the main concentration of bottle glass, with a further single isolated square (Q) established 4.35m to the northeast over two more glass fragments (Fig. 13.3).

The surface of each square was systematically mapped, photographed and described to show the presence, location and orientation of surface materials, including glass, stone artefacts and shell material. All the surface glass fragments were then plotted in three dimensions using a local datum before being removed

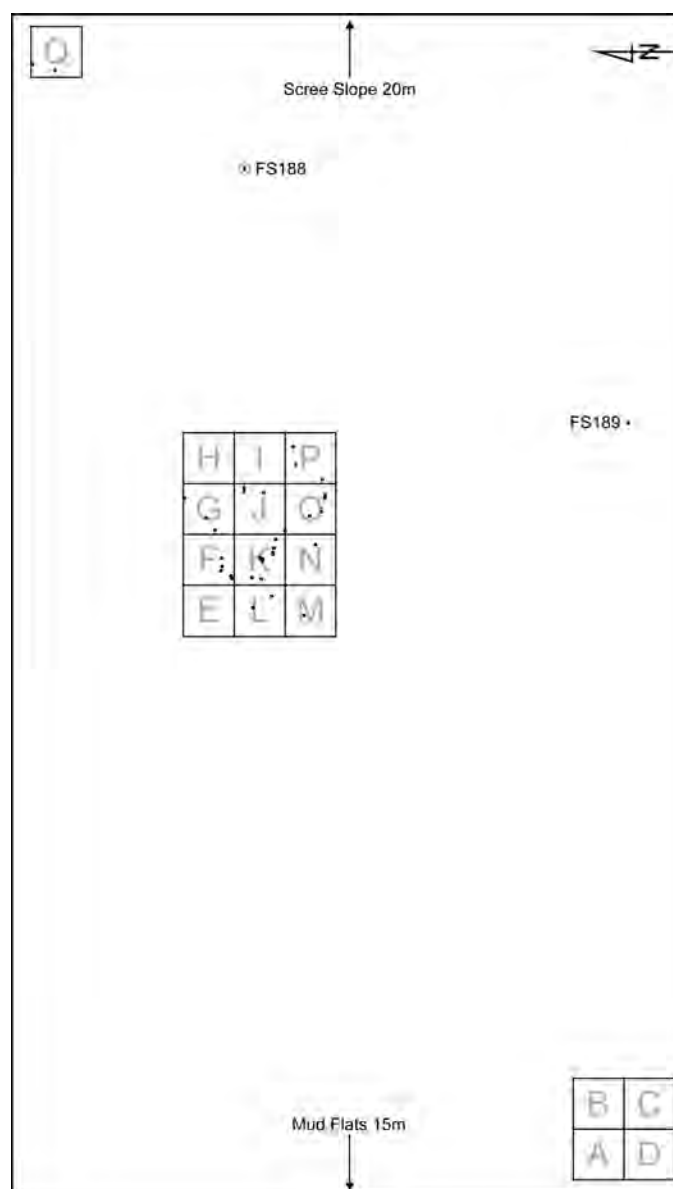


Figure 13.3 Schematic diagram of the layout of Squares A–D and E–Q, showing distribution of collected glass artefacts as solid dots (not to scale).



Figure 13.4 General view of area of glass scatter after removal of leaf litter. Flags indicate the position of glass artefacts. Facing northeast.



Figure 13.5 Glass artefact (FS188) cached in quinine tree. Facing north.



Figure 13.6 General view of completed excavation, Squares A–D. Facing northwest.

with tweezers wrapped in cling wrap, which was changed between samples to avoid cross-contamination of any residues between objects, placed into individual plastic press-seal bags and wrapped in bubblewrap for transport. In total, 36 pieces of glass, two valves of mud ark (*A. trapezia*) and a rhyolitic tuff flaked piece were collected from Squares E–Q. The glass artefact in the fork of the quinine tree was also plotted, photographed and removed. Sediment samples were collected from the surface of Squares K and Q to examine background starch and cellulose.

Squares R–S were situated on the first residual identified (Residual 1) which is a low sandy ridge (<1m), c.80m long and c.30m wide, and isolated from the mainland by a 50m wide section of mudflats densely vegetated with mangroves (Latitude: 24°11'29"S; Longitude: 151°52'18"E) (Figs 13.1–13.2). The residual is oriented roughly north-south, paralleling the orientation of Round Hill Creek, and decreases in elevation from west to east. The feature is roughly oval in shape and has a low erosion bank along its entire western and southwestern margins (Fig. 13.7). Abundant shell dominated by mud ark (>200 valves/m²) is exposed along the entire length of the erosion bank, with a smaller contribution from oyster and whelk. Flaked stone artefacts manufactured on rhyolitic tuff are also visible along the erosion bank (>3/m²), with no other raw materials observed.

Squares R–S were excavated as conjoining 50cm × 50cm pits to form a 1m × 50cm trench oriented at right angles to the frontal erosion bank, where the densest concentration of shell material is exposed 3.7m to the east. The trench was excavated on the first flat area west of the erosion bank. A local excavation datum was established 500cm north of the centre of the trench. Excavation proceeded in shallow, arbitrary excavation units averaging 3.6cm in depth and 11.4kg in weight. Excavation ceased at a maximum depth of 67.2cm below ground surface after several units of culturally-sterile sediments had been removed (Fig. 13.8). A total of 37 XUs was removed, distributed as follows: Square R (18 XUs), Square S (19 XUs). A total of 421.7kg of sediment was excavated. Excavated sediments were gently dry-sieved through 3mm

screens onto a plastic tarpaulin located 3m northeast of the excavation. Stone (n=17), charcoal (n=5) and shell (n=1) specimens encountered *in situ* during excavation were plotted three-dimensionally. A sediment core was extracted from Square S below the base of the excavation (see below) (Fig. 13.9).

Cultural deposit and stratigraphy

Excavation revealed a shallow archaeological deposit containing a range of shellfish remains and stone artefacts overlying culturally-sterile sands and muds (Table 13.1). As both Squares A–D and R–S were situated on sandy ridges, bedrock was not reached, although excavation continued below the last cultural material encountered *in situ* to aid in identification of the base of the archaeological deposit. Squares A–D yielded quantities of shellfish remains, dominated by oyster (*S. glomerata*) and mud ark (*A. trapezia*), concentrated in the top 40cm of the deposit. Numbers of stone artefacts were also recovered from the upper deposit. Degraded shell and small shell fragments were recovered to the base of the excavation. Fish bone was recovered throughout the excavation. Artefacts manufactured on non-local raw materials, including chert and volcanic ash, were recovered towards the base of excavation. This is in contrast to the stone artefacts recovered from upper units, which are almost exclusively manufactured on rhyolitic tuff. Basal sediments contained quantities of pumice and large pieces of highly degraded rhyolitic tuff. The deposit can be divided into three major stratigraphic units (SUs) on the basis of sediment colour and texture (Table 13.2, Fig. 13.10) grading from dark greyish brown in the top half of the profile to light grey at its base. The base of the excavation appears to be culturally-sterile. Acidity (pH) values increase with depth from 6.0 to 8.0.

Squares R–S revealed a shallow cultural deposit largely confined to a layer of shell which extended across the trench at a depth of 20–30cm. The layer is dominated by oyster and mud ark and is associated with rhyolitic tuff artefacts and scattered charcoal. The location and



Figure 13.7 General view of shell material concentrated on erosion bank of Residual 1. Facing south.



Figure 13.8 General view of completed excavation, Squares R–S. Note position of shell material in the upper deposit. Facing north.



Figure 13.9 Core taken from below the limits of excavation, Square S. Note distinctive break (at c.75cm below ground surface) between coarse light yellow sands and dark organic muds.

composition of the layer is consistent with the material visible on the adjacent erosion bank. Very little cultural material was recovered below the shell layer. Occasional small shell fragments were recovered to the base of excavations, although these minute fragments may have been displaced by crab burrowing (see below). All sediments comprise brown sands and have been divided into three major stratigraphic units (SUs) (Table 13.3, Fig. 13.11). The majority of the basal unit (SU III) appears to be culturally-sterile. The pH values range from slightly acidic (6.0) to neutral (7.0), with the higher values towards the base of the deposit.

Table 13.1 Tom’s Creek Site Complex, Squares A–D, R–S: summary excavation data and dominant materials.

SQUARE	XUs (#)	DEPTH (cm)	WEIGHT (kg)	SHELL (g)	BONE (g)	CHARCOAL (g)	ARTEFACTS (g)	STONE (g)	ORGANIC (g)
A	23	89.5	280.1	3276.5	13.1	122.7	44.4	456.4	1362.2
B	24	90.5	296.2	2944.1	9.9	120.6	60.6	659.4	1334.9
C	24	89.7	319.3	2658.8	10.9	151.6	30.5	405.8	1406.6
D	23	88.4	290.1	2426.5	9.6	149.1	69.6	200.7	1805.7
R	18	66.8	213.4	2311.5	0.5	86.7	21.6	181.7	1635.1
S	19	67.2	208.3	2475.2	0.4	93.2	16.2	401.8	1900.0
Total	131	-	1607.4	16092.6	44.4	723.9	242.9	2305.8	9444.5

Table 13.2 Stratigraphic Unit descriptions, Tom’s Creek Site Complex, Squares A–D.

SU	DESCRIPTION
I	Extends across the entire square with an average depth of c.10cm and a maximum depth of 17cm below ground surface. The unit comprises loosely consolidated dark grey (10YR-4/1) to dark greyish brown (10YR-4/2) fine to medium subrounded and poorly-sorted humic sands. The unit contains numerous small, fibrous roots with occasional larger roots present. Cultural materials include oyster, mud ark and charcoal. pH values are slightly acidic (6.0–6.5).
II	Extends across the entire square with a maximum thickness of 46cm and a maximum depth of 56cm. Comprises greyish brown (10YR-5/2) to dark greyish brown (10YR-4/2) poorly-sorted, fine and subrounded sediments. Although small roots are common, there is a general decrease in the abundance of roots with depth. This unit contains the majority of cultural material recovered from the excavation, including shell, stone artefacts and charcoal. Shell is more abundant in the top half of this unit, decreasing with depth. pH values are slightly acidic (6.5) to alkaline (8.0).
III	Extends across the entire base of the excavation with a minimum thickness of 40cm and a maximum depth of at least 90cm below the surface. The base of this unit was not reached. Sediments comprise loosely consolidated greyish brown (10YR-5/2) to light brownish grey (10YR-6/2) sediments. The unit is defined by the almost complete absence of shell and a dramatic reduction in the presence of roots. The top half of this unit includes artefacts made on non-local stone as well as occasional rhyolitic tuff artefacts. The basal units of the excavation appear to be culturally-sterile with occasional non-artefactual stone and pumice. pH values are slightly alkaline (7.5) to alkaline (8.0).

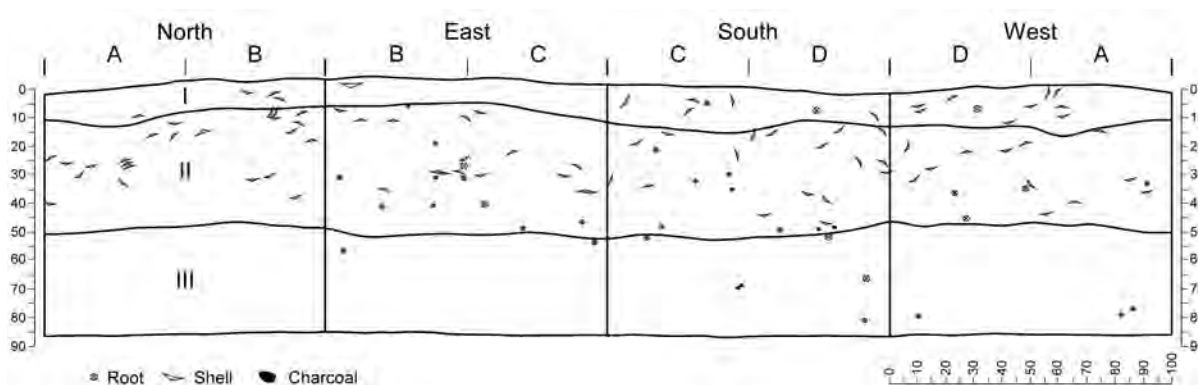


Figure 13.10 Stratigraphic section, Tom’s Creek Site Complex, Squares A–D.

Table 13.3 Stratigraphic Unit descriptions, Tom's Creek Site Complex, Squares R-S.

SU	DESCRIPTION
I	Extends across the entire trench with an average depth of 5cm and a maximum depth of 7cm below the surface. Sediments are loosely consolidated pale brown (10YR-6/3) to greyish brown (10YR-5/2) and medium, poorly-sorted and subrounded. Few roots were encountered. Small quantities of shell and stone fragments occur. pH values are slightly acidic (6.0-6.5).
II	Extends across the entire trench with a maximum thickness of 27cm and a maximum depth of 33cm. It comprises well-consolidated greyish brown (10YR-5/2) sediments with numerous roots ranging in size from fine to large. Sediments are poorly-sorted, fine to medium and subrounded. This unit is defined by an abundance of shell material. Oyster dominates at the top, grading to a dense layer of shell dominated by mud ark across the base of the unit. Stone artefacts were found throughout the shell layer. Scattered blocky charcoal and small pieces of pumice are also present. pH values are slightly acidic (6.5) to neutral (7.0).
III	Extends across the entire base of the trench with a minimum thickness of 40cm and a maximum depth of at least 69cm below the surface. The base of this unit was not reached. Subsequent coring of the sediments below the limits of excavation showed that mangrove muds and clays underlie this unit. Sediments are loosely consolidated light grey (10YR-7/1) to pale brown (10YR-6/3) and are dominated by well-sorted, fine and subrounded grains. Occasional roots present, though decreasing with depth. This SU immediately underlies the base of the dense shell layer at the base of SUII. Small quantities of fragmented shell occur at the top of this unit but appear to be absent at the base. The majority of this unit therefore appears to be culturally-sterile. Scattered charcoal present. Pumice nodules increase in abundance and size with depth. pH values are neutral (7.0) to slightly alkaline (7.5).

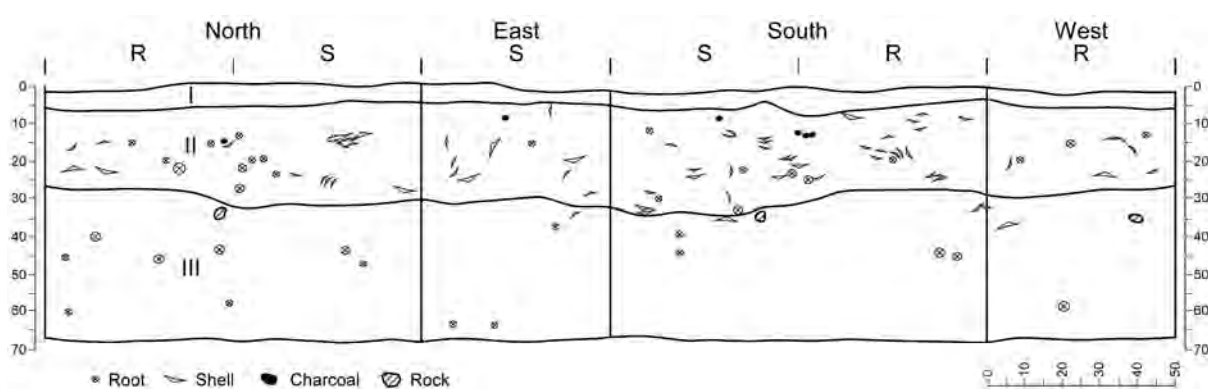


Figure 13.11 Stratigraphic section, Tom's Creek Site Complex, Squares R-S.

Radiocarbon dating and chronology

Ten radiocarbon dates are available for the site (Table 13.4). Six conventional radiocarbon dates were obtained on charcoal and three on mud ark (*A. trapezia*). In addition, a single accelerator mass spectrometry (AMS) date was obtained on organic material from the sediment core recovered below the base of excavation of Square S. The available dates include two shell/charcoal paired samples (Wk-7838/Wk-7686 and Wk-7682/Wk-7681) obtained to investigate local estuarine reservoir conditions. The first pair (Wk-7838/Wk-7686) was from the dense shell layer encountered in Square S, returning an apparent age difference of 90 ^{14}C years with $\Delta R = -305 \pm 61$. Unfortunately, no absolute result was obtained from the second pair (Wk-7682/Wk-7681) from close to the surface of Square D owing to the very recent age of the charcoal sample. Calibration calculations for dates obtained on marine shell samples in Table 13.4 therefore employ a ΔR value of -305 ± 61 as a provisional estimate until more data are available to resolve this value further in the Round Hill Creek estuary (see Chapter 4 for details).

The bottle glass assemblage provides a useful adjunct to the radiocarbon assays in resolving the site chronology. The assemblage consists of so-called 'black' glass, which is actually dark green. 'Black' glass was manufactured throughout the period between AD 1850s-AD 1920s for the storage and transport of beer and wine (Errol Beutel, Queensland Museum, pers. comm., 1999). Although a more precise assignment of age is not possible in the absence of manufacturer's marks

or other diagnostic features, the glass in the assemblage dates to the late nineteenth/early twentieth centuries.

The six radiocarbon dates available from Square D are generally in sequence and indicate deposition began in this area around 950 years ago and ended in the historical period. Although the charcoal determination Wk-7681 could not be assigned an absolute age, the sample clearly dates to the last 200 years (%Modern= 99.5±0.6). The ¹⁴C ages of Wk-7682 and Wk-10966 appear to be inverted. The calibrated ages of these determinations overlap at two standard deviations owing to the large error reported for Wk-10966 combined with the estimated error in the ΔR value applied in the calibration of Wk-7682. Although it is therefore possible that the two determinations are actually of a similar age, the values point to possible post-depositional disturbance of this section of the deposit. In the absence of stratigraphic evidence indicating a change in depositional history in this part of the site, a simple age-depth relationship suggests that these sediments are likely to be in the order of 500 years old. The lowest three dates are broadly in sequence, with some uncertainty introduced by the shell date Wk-7683, again owing to a lack of confidence in the ΔR value for this estuary (see Chapter 4 for discussion). Despite this uncertainty, the sequence clearly indicates first occupation of this part of the site only in the last 1,000 years, with the modern determination at the top and the glass artefacts found on the surface of the site nearby supporting an early twentieth century *terminus post quem* for Aboriginal use of the site.

Table 13.4 Radiocarbon dates from the Tom's Creek Site Complex (see Appendix 1 for full radiometric data for each determination).

SQUARE	XU	DEPTH (cm)	LAB. NO.	SAMPLE	$\delta^{13}\text{C}$ (‰)	¹⁴ C AGE	CALIBRATED AGE/S
D	3	3.9	Wk-7681	charcoal	-27.2±0.2	modern	modern (see text)
D	3	3.3	Wk-7682	<i>A. trapezia</i>	-1.2±0.2	620±50	646(521)425
D	8	22.2-25.5	Wk-10966	charcoal	-25.7±0.2	269±125	517(290)0
D	15	50	Wk-7683	<i>A. trapezia</i>	-1.2±0.2	940±50	939(776)647
D	17	55.7-59.5	Wk-7684	charcoal	-26.8±0.2	880±70	926(734)658
D	18	59.5-64	Wk-7685	charcoal	-27.5±0.2	1110±70	1170(966)794
S	8	20.5-24	Wk-7686	charcoal	-25.3±0.2	540±50	625(524)474
S	8	20.5-24	Wk-7838	<i>A. trapezia</i>	-0.9±0.2	630±50	650(527)432
S	11	31.7-35	Wk-10965	charcoal	-26.4±0.2	1070±115	1227(946,943,933)693
S	Core	c.75	NZA-13385	organics	-26.2±0.2	1956±57	1992(1870)1711

The three dates available for Squares S derive from the shell layer located between c.20–30cm. Wk-10965 dates the transition between SUII and SUIII with the later deposits thought to be largely culturally-sterile. The resulting calibrated date of c.943 cal BP is similar to that obtained for the earliest deposits on the mainland at Squares A–D. The other two dates from within the shell layer itself indicate that the vast majority of cultural deposition at this site occurred between 1,000–500 cal BP. The shallow and limited distribution of cultural materials also support the idea that material in the shell layer was discarded over a relatively short time-span. The date from the organic mangrove facies underlying the archaeological deposit at Squares R–S points to a very recent chronology for the formation of the low dunes abutting the Tom's Creek peninsula. The date indicates that the dunes containing cultural materials in the vicinity of Squares A–D and R–S probably only date to a phase of recent dune-building in the last 2,000 years.

Stratigraphic integrity and disturbance

Several lines of evidence suggest that while deposits at Squares R–S exhibit good integrity, Squares A–D have zones of relatively poor integrity. Root penetration appears to be a major source of

disturbance in the area of Squares A–D. Numerous roots were encountered in the top 30cm of this deposit, almost entirely composed of small diameter (<3mm) red roots which are generally oriented vertically in the deposit and most likely derive from the large weeping cabbage palms fringing the swale to the southwest of the excavation. This pattern of root growth would tend to push material up through the deposit. Therefore, cultural material is more likely to be displaced upwards rather than downwards through the deposit over the long-term, providing that the local vegetation composition has remained stable.

Conjoin analysis of the *A. trapezia* assemblage suggests that despite exhibiting an overall low density of cultural materials, both excavated deposits retain reasonable integrity. Out of a total dataset of 228 measured intact and broken valves, 122 were discarded owing to an absence of hinge length or valve length and width indicating the presence of marginal damage. This left 106 relatively intact valves for consideration in the conjoin analysis, distributed as follows: Squares A–D (45 valves); Squares R–S (61 valves). Methods proceeded as described in Chapter 5. A total minimum number of five *A. trapezia* conjoins was identified in Squares A–D and nine in Squares R–S (Tables 13.5–13.6). In Squares A–D most pairs were separated by less than 16cm. A single conjoin exhibited a maximum separation of up to 20cm, although it should be noted that this valve has a minimum separation of 11.54cm. These results suggest that material in the lower part of the cultural deposit in particular (i.e. below 30cm) may have been displaced up to 10–20cm from their original point of deposition. The nine conjoins in Squares R–S are all separated by less than 8cm with most separated by less than 5cm. All of the identified conjoins from Squares R–S derive from the shell layer encountered between c.20–30cm below ground surface, indicating good integrity for this feature. Overall the *A. trapezia* assemblage exhibits a high ratio of broken to intact valves (average 11:1), which is similar between the excavation squares.

Table 13.5 Identified *A. trapezia* conjoin sets, Tom's Creek Site Complex, Squares A–D.

CONJOIN SET	SQUARE/XU		MEAN DEPTH (cm)	MIN. SEPARATION (cm)	MAX. SEPARATION (cm)
	L	R			
Set 1	B/2	C/3	4.37	2.92	8.5
Set 2	B/8	A/8	24.24	0	6.60
Set 3	B/9	B/8	24.55	0	7.22
Set 4	B/9	D/13	34.12	11.54	20.00
Set 5	A/12	C/9	35.37	9.62	15.9

Table 13.6 Identified *A. trapezia* conjoin sets, Tom's Creek Site Complex, Squares R–S.

CONJOIN SET	SQUARE/XU		MEAN DEPTH (cm)	MIN. SEPARATION (cm)	MAX. SEPARATION (cm)
	L	R			
Set 1	S/8	S/8	22.24	0	3.44
Set 2	S/8	R/8	22.45	0	3.02
Set 3	R/8	S/8	22.45	0	3.02
Set 4	S/8	R/9	23.71	0	6.38
Set 5	S/9	S/8	24.30	0	7.56
Set 6	S/9	S/8	24.30	0	7.56
Set 7	R/9	S/9	25.97	0	4.22
Set 8	S/9	S/9	26.02	0	4.12
Set 9	S/9	S/9	26.02	0	4.12

Laboratory methods

Owing to the relatively low density of cultural material recovered from the Tom's Creek Site Complex, all squares were analysed to maximise the available sample (see Chapter 3 for a detailed discussion of the standard laboratory methods employed at all sites). Results from all squares are summarised below, although only selected data from Squares A and R are illustrated in Figures 13.12–13.19. Further summary results for all excavated squares are available in Appendix 4. Use-wear and residue analyses were conducted on the bottle glass and stone artefact assemblages in the Archaeological Sciences Laboratory, University of Queensland.

Cultural materials

Invertebrate remains

Twenty-two taxa of shellfish weighing 16,092.6g were recovered from Squares A–S, consisting of eight marine bivalves, 10 marine gastropods and four terrestrial gastropods (Table 13.7). The shell assemblage is dominated by rock oyster (*S. glomerata*), comprising 64.8% of the shell assemblage by weight (Figs 13.12–13.13), followed by mud ark (*A. trapezia*) (32.6%) and scallop (*P. sugillata*) (1.2%). The remaining 19 taxa are relatively rare, each contributing less than 1% of the shell assemblage by weight, comprising taxa common to mangrove environments such as the common nerite (*Nerita balteata*) and periwinkle (*Bembicium nanum*). The assemblage exhibits low diversity with a calculated Shannon-Weaver Function (H') of 0.942 and Simpson's Index of Diversity (1-D) of 0.41. A bimodal trend in the vertical distribution of oyster and mud ark is evident in the shell layer at Squares R–S, with mud ark more common at the base of the shell layer (Fig. 13.13). This pattern does not occur in deposits in Squares A–D (Fig. 13.12) which overlap in time with those at Squares R–S, indicating that the bimodal pattern in this case may be related to taxa-focussed foraging strategies rather than local environmental availability. A noteworthy inclusion in the shellfish assemblage is the open beach dwelling pipi (*Donax deltoides*) in every excavated square. Although only represented in small quantities, the presence of this taxon suggests the possibility of transport from nearby open beaches 3.5km to the east (Fig. 13.1). The weight of shell recovered from each square is remarkably consistent across the site, with an average of 2,682g/square (range 2,312–3,277g) (Table 13.1). The range of shellfish taxa recovered indicate gathering activities focussed on the intertidal zone and creek margin habitats adjacent to the site.

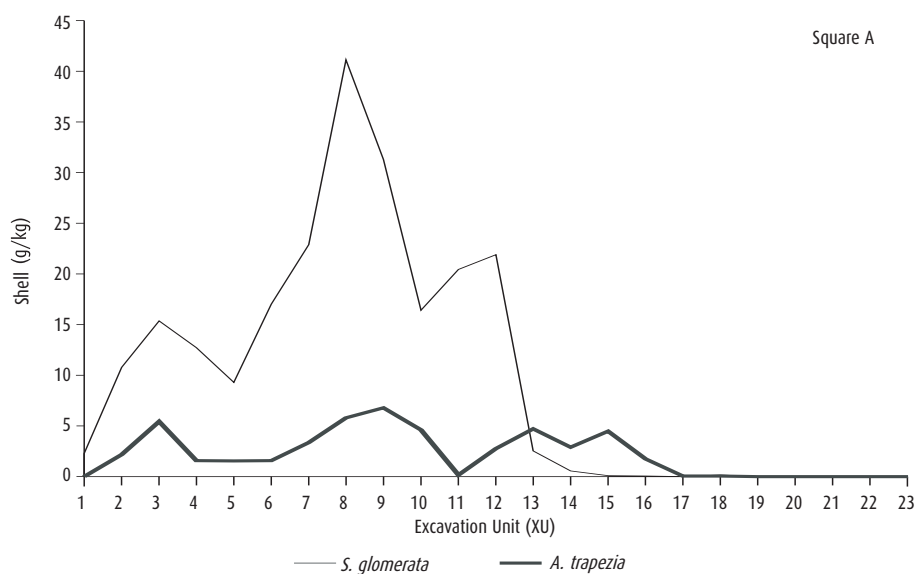


Figure 13.12 Abundance of dominant shell taxa.

Table 13.7 Presence/absence of shellfish identified in the Tom's Creek Site Complex, Squares A-S.

FAMILY	SPECIES	SQUARE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL (g)	
MARINE BIVALVIA																												
Arcidae	<i>Anadara trapezia</i>	A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
		B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		D		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		R		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		S		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	5242.6788
Corbulidae	<i>Corbula crassa</i>	B			X																						0.0973	
Donacidae	<i>Donax deltooides</i>	A			X		X		X	X																		
		B	X										X															
		C		X					X						X													
		D				X																						
		R			X	X				X	X	X																
		S		X	X		X		X																			14.7604
Mytilidae	<i>Trichomya hirsutus</i>	A											X	X														
		B													X													
		C			X		X		X	X	X	X	X	X														
		D		X						X	X																	
		R					X	X																				
		S		X	X	X			X	X																		9.3398
Ostreidae	<i>Saccostrea glomerata</i>	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		D	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Pteriidae	<i>Pinctada albina sugillata</i>	A	X	X	X		X	X	X	X	X	X	X															
		B	X	X	X	X	X	X	X	X	X	X	X									X						
		C		X	X	X	X	X	X	X	X	X	X			X												
		D	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	10430.9731
Veneridae	<i>Dosinia tumida</i>	A	X	X	X		X	X	X	X	X	X	X															
		B	X	X	X	X	X	X	X	X	X	X	X										X					
		C		X	X	X	X	X	X	X	X	X	X			X												
		D	X	X	X	X	X	X	X	X	X	X	X															
		R	X	X	X	X	X	X	X	X	X	X	X															
		S	X	X	X	X	X	X	X	X	X	X	X															188.0454
Veneridae	<i>Irus sp.</i>	S							X																	1.1078		
Veneridae	<i>Irus sp.</i>	S							X																	0.2563		
MARINE GASTROPODA																												
Batillariidae	<i>Pyrazus ebininus</i>	C							X																			
		D								X																		3.3332
Batillariidae	<i>Velacumantus australis</i>	D						X																			0.1444	
Ellobiidae	<i>Ophicardelus sulcatus</i>	B																							X			
		R	X	X	X																							
		S	X	X																								0.8799
Lottidae	<i>Acmaeid sp.</i>	S				X																				0.0625		
Littorinidae	<i>Bembicium nanum</i>	A				X				X		X		X		X												
		B								X																		
		C	X																									
		D							X	X				X		X												
		R			X		X																					
		S				X	X	X																				4.9315
Muricidae	<i>Bedeva paivae</i>	A											X	X														
		B			X																							
		D					X																					
		R			X		X																					
		S							X																			1.6023

continued over

Table 13.7 continued

FAMILY	SPECIES	SQUARE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL (g)		
MARINE GASTROPODA continued																													
Neritidae	<i>Nerita balteata</i>	A			X	X			X	X	X	X		X	X														
		B		X	X	X	X	X	X	X	X	X	X	X	X														
		C		X		X	X	X	X	X					X														
		D			X		X	X	X	X	X	X					X								X				
		R			X	X	X	X	X	X		X																	
		S		X	X	X	X	X		X	X																		69.9560
Neritidae	<i>Nerita squamulata</i>	D								X																		0.2042	
Planaxidae	<i>Planaxis sulcatus</i>	A						X																				0.1681	
Trochidae	<i>Thalotia</i> sp.	A											X																
		D					X																						
		R						X		X																			0.9177
TERRESTRIAL GASTROPODA																													
Camaenidae	<i>Figuladra</i> sp.	A		X	X	X	X	X	X	X	X	X	X	X	X	X													
		B		X	X	X	X	X	X	X	X									X	X								
		C		X	X	X	X	X	X	X	X									X	X								
		D		X	X	X		X	X	X	X	X	X	X	X	X				X									
		R		X	X			X		X	X																		
		S								X																			
Camaenidae	<i>Trachiopsis mucosa</i>	A	X	X	X	X	X	X	X	X	X	X	X	X	X										X				
		B		X	X	X	X	X	X		X	X		X	X												X		
		C		X		X	X			X			X																
		D		X	X	X	X	X	X	X	X	X	X	X	X	X				X					X				
		R				X			X																				
		S			X																								9.9973
Pupillidae	<i>Pupoides pacificus</i>	B									X																		
		R		X																									0.0748
Subulinidae	<i>Eremopeas tuckeri</i>	A		X	X																								
		B		X	X	X				X																			
		C		X	X	X																							
		D		X	X	X																							
		R			X																								4.8858

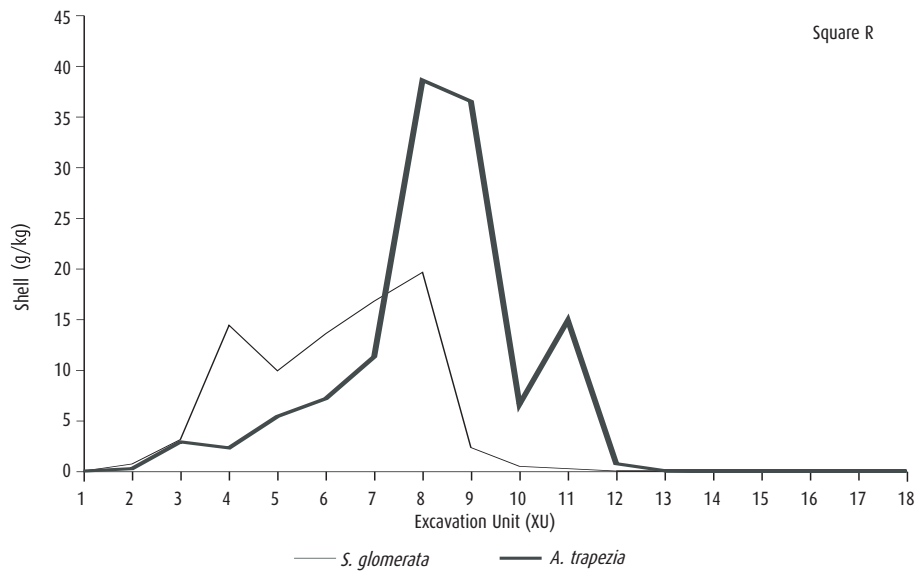


Figure 13.13 Abundance of dominant shell taxa.

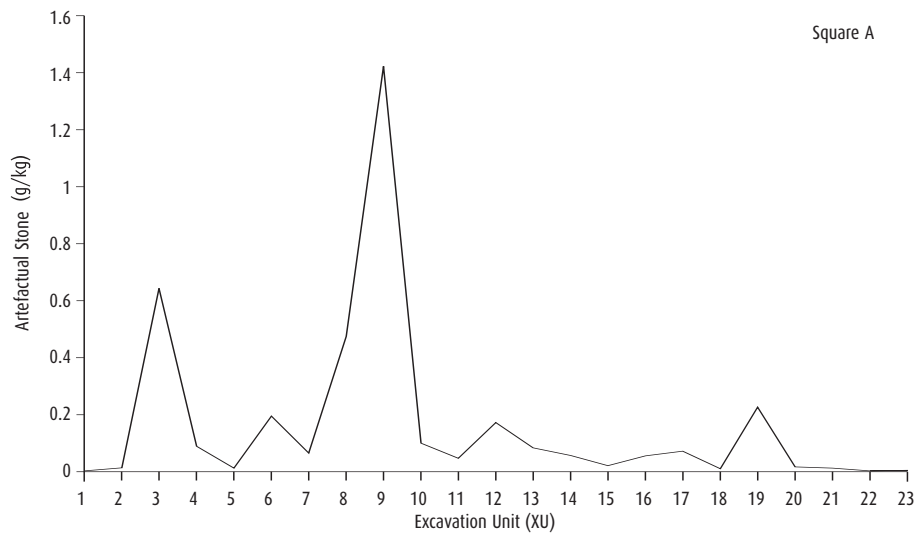


Figure 13.14 Abundance of artefactual stone.

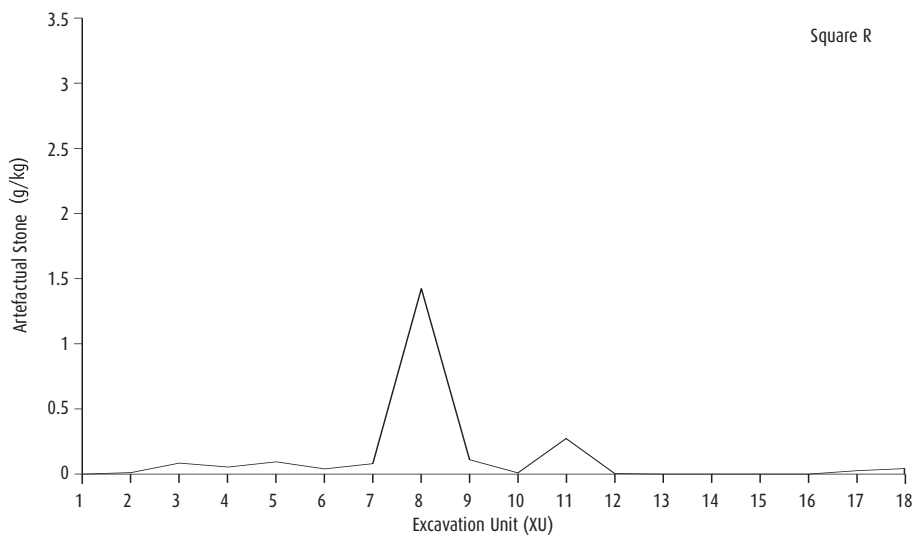


Figure 13.15 Abundance of artefactual stone.

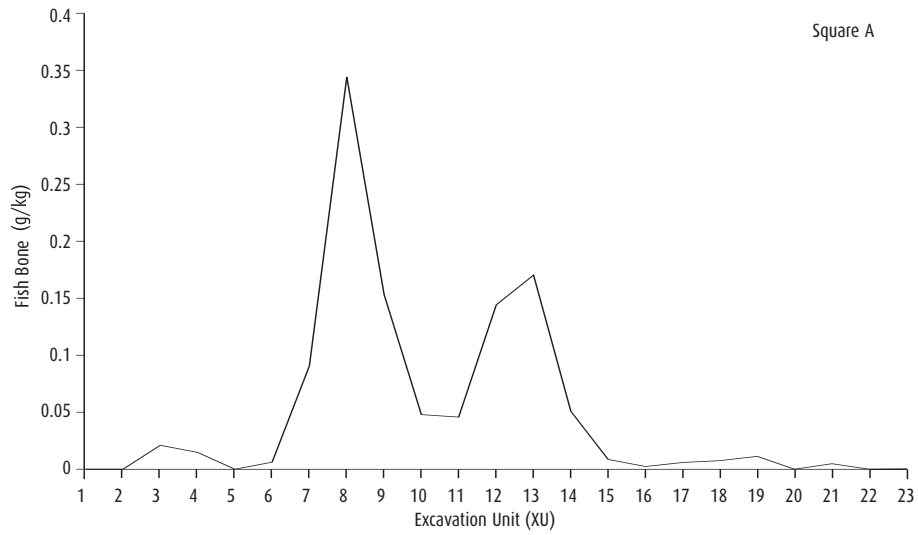


Figure 13.16 Abundance of fish bone.

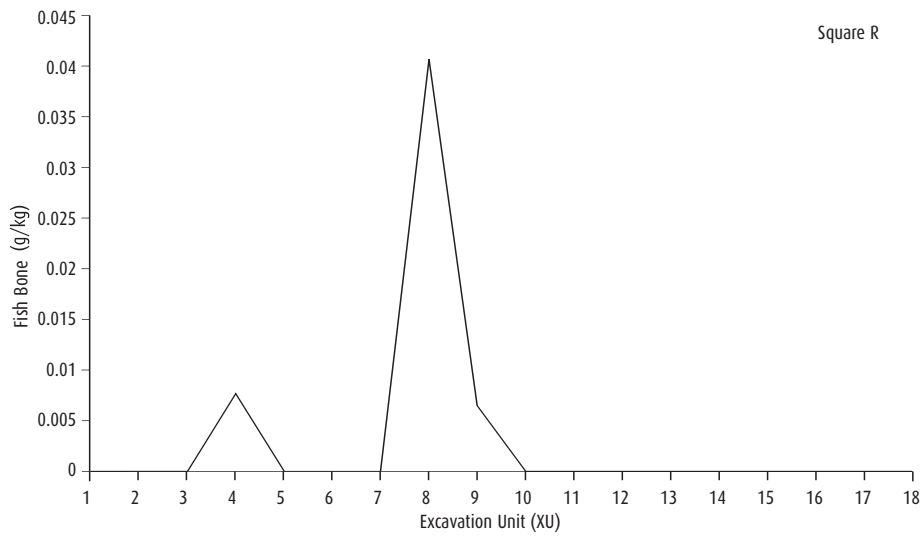


Figure 13.17 Abundance of fish bone.

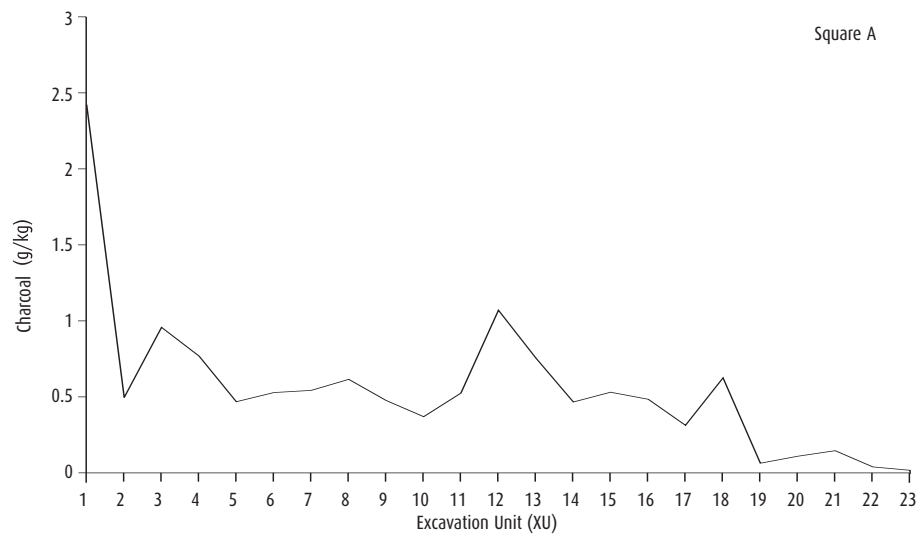


Figure 13.18 Abundance of charcoal.

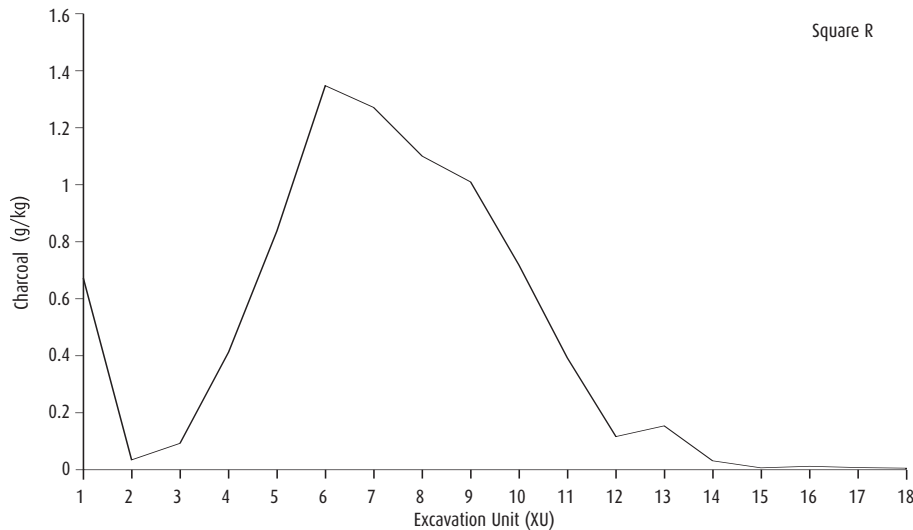


Figure 13.19 Abundance of charcoal

Table 13.8 Metrical data for intact and broken (with umbo) *A. trapezia* valves from the Tom's Creek Site Complex, Squares A–D. Note that excavation units for each square have been collapsed for purposes of analysis. Excavation unit depth and size is approximately equivalent across squares for broad comparison.

XU	MEAN LENGTH			MEAN WIDTH			MEAN HEIGHT			MEAN WEIGHT			MEAN HINGE		
	n	mm	±	n	mm	±	n	mm	±	n	g	±	n	mm	±
2	0	0	0	1	37.8	0	6	14.7	2.0	8	9.2	2.5	2	25.5	6.4
3	3	39.0	4.6	6	26.5	5.6	8	15.0	2.1	9	15.5	6.0	6	29.0	4.6
4	2	20.6	0.4	2	18.4	0.6	5	16.0	0.9	5	11.5	4.1	2	30.0	4.2
5	1	47.1	0	5	30.8	6.5	8	17.6	2.0	8	14.3	5.4	5	28.6	4.0
6	0	0	0	0	0	0	1	17.0	0	1	13.3	0	0	0	0
7	0	0	0	1	38.4	0	2	16.5	1.1	2	12.0	3.4	1	30.0	0
8	3	48.4	6.5	4	43.3	3.3	4	18.4	1.4	4	18.7	3.0	4	31.3	3.6
9	2	54.0	0.4	2	48.3	3.3	6	19.4	1.3	8	20.5	5.9	5	33.6	3.5
10	0	0	0	2	39.7	11.0	5	18.0	3.5	5	18.1	7.0	3	29.7	4.9
11	0	0	0	1	34.7	0	2	15.2	0.6	2	11.3	0	1	28.0	0
12	0	0	0	0	0	0	5	17.6	3.1	6	13.4	5.6	3	25.0	7.2
13	1	59.0	0	2	28.0	6.4	9	19.7	3.2	13	19.3	11.2	7	35.3	5.3
14	0	0	0	1	36.7	0	8	16.1	2.0	9	12.6	5.2	6	30.3	3.4
15	1	55.0	0	1	48.0	0	4	16.3	2.1	5	17.7	7.8	0	0	0
16	0	0	0	0	0	0	1	19.3	0	1	16.8	0	0	0	0

There is no significant change in the mean size of *A. trapezia* throughout either the Squares A–D deposit as measured by height ($\chi^2=2.1765$, $df=14$, $p\leq 0.05$) or hinge length ($\chi^2=3.1568$, $df=11$, $p\leq 0.05$) (Table 13.8) or the Squares R–S deposit as measured by height ($\chi^2=2.48$, $df=9$, $p\leq 0.05$) or hinge length ($\chi^2=2.3738$, $df=7$, $p\leq 0.05$) (Table 13.9). The mean length of *A. trapezia* (as approximated by regression from the height measurements, $y=1.8847x+14.491$) for Squares A–D is c.47mm and for Squares R–S is c.45mm.

Table 13.9 Metrical data for intact and broken (with umbo) *A. trapezia* valves from the Tom's Creek Site Complex, Squares R-S. Note that excavation units for each square have been collapsed for purposes of analysis. Excavation unit depth and size is approximately equivalent across squares for broad comparison.

XU	MEAN LENGTH			MEAN WIDTH			MEAN HEIGHT			MEAN WEIGHT			MEAN HINGE		
	n	mm	±	n	mm	±	n	mm	±	n	g	±	n	mm	±
2	1	42.2	0	1	40.2	0	1	16.2	0	1	16.4	0	1	28.0	0
3	0	0	0	2	37.6	0.5	3	15.1	2.5	3	10.6	2.7	1	27.0	0
4	0	0	0	0	0	0	3	13.2	2.1	4	8.9	3.9	0	0	0
5	1	30.2	0	2	35.8	6.6	3	14.4	2.0	5	12.4	3.6	1	23.0	0
6	3	18.8	4.0	3	17.0	3.7	13	16.7	2.3	13	15.8	7.5	8	29.9	3.7
7	0	0	0	0	0	0	3	18.7	1.9	5	17.6	3.4	1	32.0	0
8	10	16.6	5.5	16	22.7	5.2	31	18.2	3.4	35	19.7	5.7	21	31.5	39.0
9	2	49.8	0.4	6	43.9	2.7	35	18.5	2.2	39	19.8	7.5	25	33.7	3.9
10	0	0	0	1	44.3	0	2	16.7	2.0	11	6.1	3.3	0	0	0
11	0	0	0	0	0	0	14	13.0	3.4	24	7.4	4.1	3	29.7	3.5
12	0	0	0	0	0	0	0	0	0	2	1.5	1.5	0	0	0

Vertebrate remains

Fish bone is represented in almost every excavation unit in Squares A–D but is rare in Squares R–S (Tables 13.10–13.11). A total of 43.42g of fish bone was recovered from Squares A–D, consisting of 2,703 pieces of bone and a NISP of 30. A total MNI of 27 was calculated by summing the MNI for each excavation unit (Table 13.10). Identified taxa in descending order of abundance include Sillaginidae (NISP=19; MNI=16), Sparidae (NISP=10; MNI=10) and Platycephalidae (NISP=1; MNI=1). Fish bone is most abundant in units where shell is also abundant (compare Figs 13.12 and 13.16).

In Square A six taxonomic identifications were made. An otolith from XU3 was identified as bream (*Acanthopagrus australis*), an abdominal vertebra from XU6 was found to be Sillaginidae (whiting), a supraoccipital from a Sparidae (bream, tarwhine, snapper) was recovered from XU7, a Platycephalidae (flathead) from XU8 was identified from an atlas vertebra, and XU12 had a maxilla and otolith identified to Platycephalidae (flathead) and bream respectively. Five taxonomic identifications were made for Square B. Otoliths identified as Sillaginidae were identified in XU3, 11, 12 and 13 and a supraoccipital assigned to the taxon Sparidae was recovered from XU9. In Square C, 14 taxonomic identifications were made. A single Platycephalidae was identified from a dentary in XU3 and a single Mugilidae abdominal vertebra was found in XU12. Two Sparidae were identified in XU4, 12 and 13 on the basis of molars, an atlas vertebrae and an otolith. It is possible that these Sparidae elements in adjacent excavation units belong to the same fish. Seven Sillaginidae identifications were made in XU12, 13, 14 and 15 on the basis of otoliths and one vertebrae. Five taxonomic identifications were made for Square D. Sparidae were identified in XU2 and eight using an otolith and premaxilla. A Platycephalidae prevomer was found in XU13. Two Sillaginidae vertebrae were identified in XU13 (see Vale 2004 for further details).

Only 0.85g of fish bone was recovered from Squares R–S, consisting of eight pieces of bone, a NISP of three and an MNI of three. All bone is associated with the level of the shell layer (compare Figs 13.13 and 13.17). Three taxonomic identifications were made on this material. In Square R, XU8, otoliths were identified as bream (*Acanthopagrus australis*) and Sillaginidae. In Square S, XU4, a Sparidae otolith was recovered (see Vale 2004 for further details).

Table 13.10 Fish bone abundance, Tom's Creek Site Complex, Squares A-D.

XU	SQUARE A			SQUARE B			SQUARE C			SQUARE D		
	NUMBER SPECIMENS	TOTAL WEIGHT (g)	MNI	NUMBER SPECIMENS	TOTAL WEIGHT (g)	MNI	NUMBER SPECIMENS	TOTAL WEIGHT (g)	MNI	NUMBER SPECIMENS	TOTAL WEIGHT (g)	MNI
1	0	0	0	0	0	0	5	0.0528	0	0	0	0
2	0	0	0	82	0.5665	0	81	1.0401	0	0	0.2552	1
3	7	0.2526	1	39	0.5470	1	15	0.2598	2	2	0.1290	0
4	10	0.1404	0	36	0.7016	0	62	1.3253	1	1	0.0896	0
5	0	0	0	32	0.4267	0	58	0.9688	0	0	0	0
6	5	0.0606	1	43	0.3925	0	27	0.3866	0	0	0.5261	0
7	116	1.1328	1	10	0.4233	0	48	0.5788	0	0	0.7199	0
8	108	3.9539	1	68	0.6261	0	41	0.6590	0	0	1.1362	1
9	156	1.9140	0	41	0.6435	1	19	0.1721	0	0	0.5145	0
10	52	0.5751	0	42	0.4773	0	44	0.5837	0	0	0.3138	0
11	19	0.5520	0	121	1.0598	1	58	0.8494	0	0	0.7830	0
12	116	1.6424	2	100	1.4936	1	54	1.1036	6	4	0.3966	0
13	73	1.7695	0	111	1.7689	1	81	1.4127	3	2	2.1896	2
14	36	0.6000	0	30	0.4008	0	37	0.5668	1	1	1.6064	0
15	13	0.0973	0	14	0.0786	0	40	0.7342	1	1	0.7915	1
16	4	0.0248	0	8	0.1666	0	5	0.0801	0	0	0.0814	0
17	4	0.0728	0	3	0.0244	0	7	0.0603	0	0	0	0
18	4	0.0887	0	2	0.013	0	4	0.0200	0	0	0	0
19	13	0.1438	0	3	0.0188	0	3	0.0130	0	0	0.0127	0
20	0	0	0	1	0.0074	0	0	0	0	0	0.0511	0
21	11	0.0529	0	0	0	0	2	0.0245	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	1	0.0073	0	2	0.0154	0	0	0	0	0	0	0
Total	748	13.0809	6	788	9.8518	5	691	10.8916	14	11	476	9.5966
			6			5			14	11		5
			6			5			14	11		5
			6			5			14	11		5

Table 13.11 Fish bone abundance, Tom's Creek Site Complex, Squares R-S.

XU	SQUARE R				SQUARE S			
	NUMBER SPECIMENS	TOTAL WEIGHT (g)	NISP	MNI	NUMBER SPECIMENS	TOTAL WEIGHT (g)	NISP	MNI
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	2	0.0766	0	0	1	0.3689	1	1
5	0	0	0	0	0	0	0	0
6	0	0	0	0	1	0.0031	0	0
7	0	0	0	0	0	0	0	0
8	1	0.3168	1	1	0	0	0	0
9	1	0.0783	1	1	0	0	0	0
10	0	0	0	0	1	0.0032	0	0
11	0	0	0	0	1	0.0051	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
Total	4	0.4717	2	2	4	0.3803	1	1

Stone artefacts

Stone artefacts were recovered from all excavated squares (Table 13.12). Artefacts are more densely concentrated at this site than in all other excavated deposits in the study except the Ironbark Site Complex, where a major quarry is located (see Chapter 9). A total of 514 stone artefacts, weighing 205g, was identified in Squares A–D, 37 of which were plotted *in situ* between 0–65.4cm during excavation with the remainder recovered from the sieve residue. In Squares R–S, a total of 137 artefacts weighing 37.9g was recovered, including eight plotted *in situ* between 20.4–28.3cm. The assemblage is dominated by rhyolitic tuff, comprising 94% of the stone artefact assemblage by weight, followed by volcanic ash (4.5%), chert (0.9%), microgranite (0.5%), quartz (0.2%) and banded rhyolite (<0.1%). Rhyolitic tuff and quartz are present in local outcrops, including the scree slope demarcating the eastern boundary of the site, while fragments of microgranite recovered from excavations and water-rounded microgranite hammerstones observed on the surface must have been transported to the site, with Bustard Head, 21km to the north, the nearest source of this raw material. The precise sources of the chert, volcanic ash and banded rhyolite are currently unknown. Undiagnostic flaked pieces dominate the assemblage, with only very occasional flakes and cores. As noted, the large proportion of flaked pieces appears to be directly related to the mechanical flaking properties of rhyolitic tuff. Most artefacts are extremely small, with an average weight of 0.4g.

There is marked patterning in the vertical distribution of cultural materials in the deposit. Artefacts manufactured on non-rhyolitic tuff tended to be recovered from stratigraphic contexts below the vast majority of shell material. This pattern is generally consistent with observations made at Eurimbula Site 1 (Chapter 12). In Squares A–D, locally available materials are represented throughout the cultural deposit: rhyolitic tuff (0–75.6cm), quartz (6.5–70.9cm) and microgranite (1.6–13.6cm). In contrast, more siliceous materials that are not available in the immediate site area tend to occur towards the base of the cultural deposit: volcanic ash (55.7–71cm), banded rhyolite

Table 13.12 Stone artefacts from the Tom's Creek Site Complex, Squares A-D, R-S.

SQUARE	RHYOLITIC TUFF		VOLCANIC ASH		CHERT		BANDIED RHYOLITE		MICROGRANITE		QUARTZ		TOTAL
	FLAKE # (g)	FLAKED PIECE # (g)	FLAKE # (g)	FLAKED PIECE # (g)	FLAKE # (g)	FLAKED PIECE # (g)	FLAKE # (g)	FLAKED PIECE # (g)	FLAKE # (g)	FLAKED PIECE # (g)	FLAKE # (g)	FLAKED PIECE # (g)	
A	-	128 43.7763	-	-	1 0.0217	6 0.3405	1 0.0320	-	-	1 0.0814	-	-	137 44.2519
B	2 16.2791	141 44.1316	-	-	-	1 0.1838	-	-	-	1 0.0555	-	-	145 60.6500
C	1 4.3243	123 25.7646	-	-	-	1 0.4457	-	-	-	-	-	-	125 30.5346
D	1 0.9699	94 57.1006	2 0.992	5 1.0072	-	-	-	2 1.2570	2 1.2570	2 0.0599	2 1.2570	2 0.0599	107 69.6004
R	-	75 20.4683	-	7 0.5636	-	5 0.4620	-	-	-	3 0.1259	-	-	90 21.6198
S	-	40 15.1678	-	1 0.0571	-	4 0.7614	-	-	-	2 0.2545	-	-	47 16.2408
Total	4 21.5733	601 206.4092	2 0.992	13 1.6279	1 0.0217	17 2.1934	1 0.0320	2 1.2570	2 1.2570	9 0.5772	9 0.5772	9 0.5772	651 242.8975

(67.8cm). Although a single piece of chert was recovered around 23cm, the remaining eight pieces of chert were recovered between 50.2–89.5cm. These deposits date to before about 700 years ago. This pattern is not as clear cut in Squares R–S, although c.74% (by weight) of the artefacts made on volcanic ash/chert were recovered from below 57cm and all are extremely small in size.

The abundance of rhyolitic tuff in the artefact assemblage is not surprising given the presence of exposures of the raw material on the Tom's Creek Site Complex. However, preliminary examination of the rhyolitic tuff artefacts recovered from the excavations and those observed on the surface indicate that many of them are made on a different form of rhyolitic tuff than that available on the adjacent scree slope (Stephen Cotter, Cooperative Research Centre for Landscape Evolution and Mineral Exploration, University of Canberra, pers. comm., 1999). Rhyolitic tuff exposed on the ridge and scree slope forming the core of the peninsula is distinctive, with numerous fracture plans not common in other observed outcrops of this material in the region. Despite close examination, no unequivocal evidence for stone extraction and reduction was found along the base of the scree slope or on other parts of the peninsula. One possibility is that variation in raw material form within the Tom's Creek peninsula outcrop has been selectively removed by Aboriginal and/or European quarrying activities. Alternative nearby outcrops of rhyolitic tuff include Round Hill Head and the Ironbark Site Complex to the north on Middle Creek.

A small sample of stone artefacts from Squares A–S has been subject to limited residue analysis. Francis (1999) examined eight stone artefacts (FS9, 122, 138, 206, 220, 269, 283, 386) from a range of depths and manufactured on several different raw materials ranging in weight from 0.6–8.2g. All specimens were examined using an Olympus® metallurgical incident-light microscope under low level (<800×) magnification (see Loy 1994 for a discussion of techniques). All artefacts exhibited surface features associated with post-depositional processes including rootlets, sand grains, spores and mycelium. All of the artefacts were found to exhibit a similar suite of archaeological residues, comprising resin, cellulose, starch grains, parenchymal tissue and charcoal. Two artefacts (FS9 and 386) exhibit ridged parenchymal tissue, probably derived from the xylem tissue of a vascular plant

(Francis 1999; Raven et al. 1999), indicating probable use of the artefact in plant processing. These residue elements are consistent with use of stone artefacts in a variety of plant processing activities.

Glass artefacts

Thirty-six bottle glass artefacts, weighing 214.4g, were recovered from surface locations between Squares A-D and the base of the scree slope (Table 13.13, Figs 13.2–13.3). Most (90%) of the glass was scattered over a 3m² area (Squares E–P) with two retouched artefacts located c.4m to the northeast (Square Q). Two more artefacts were recovered: a large retouched artefact apparently cached in the fork of a quinine tree c.3m north of the main scatter (Fig. 13.5) and an isolated artefact c.3m south of the main collection grid. The assemblage consists of two bottle base sherds and 34 body sherds. No rim fragments were identified, although neck fragments may be represented in the body sherd count owing to the small size of many sherds (average weight 6g), limiting confidence in ascription of body part. All of the glass is probably from the same bottle. The absence of rim sherds raises the possibility of deliberate breakage of the bottle prior to transport (see Allen and Jones 1980; Freeman 1993). Three of the artefacts (FS186, 187, 188) exhibit marginal retouch and were located away from the main scatter. The spatial separation of the glass scatter from the glass artefacts exhibiting retouch is noteworthy. It is possible that the denser concentration of glass fragments represents a manufacturing area and the two glass flakes in Square Q and the apparently cached artefact in the quinine tree represent artefacts actually used or used more intensively. The retouched artefact in the tree (FS188) was found to conjoin with FS166 from Square K to form part of a bottle base, confirming the suspected association between the glass scatter and cached artefact. The presence of glass at a long-term Aboriginal occupation site some distance from known early European population centres supports the inference that it was discarded by Aboriginal people.

Table 13.13 Glass artefacts from the Tom’s Creek Site Complex. * indicates glass artefacts recovered beyond the mapping grid (see Fig. 13.3).

SQUARE	#	FS#	WEIGHT (g)	COMMENTS
F	5	152-156	20.2	FS152 & 153 subject to detailed analysis
G	3	157-158, 163	5.4	
J	4	159-162	10.3	
K	9	164-172	79.9	Includes base fragment
L	2	173, 175	3.6	
M	1	174	1.0	
N	1	176	1.7	
O	4	179-182	41.8	
P	3	183-185	2.9	
Q	2	186-187	9.0	Both retouched & subject to detailed analysis
*	2	188-189	38.6	FS188 retouched artefact in tree; subject to detailed analysis
Total	36	-	214.4	

Vernon (1999) conducted a use-wear and residue analysis on the glass assemblage. All 36 glass fragments were subject to preliminary microscopic examination using an Ibelix® transmitted-light microscope before selection of five artefacts for further study (FS152, 153, 186, 187, 188), including the three retouched artefacts. These five artefacts were examined for use-wear and residues using a Olympus® metallurgical incident-light microscope under low level (<800x) magnification using bright-field and dark field settings and cross-polarised light (see Loy 1994 for a discussion of techniques). Areas of shallow, parallel striations were found on most of the artefacts, which Vernon (1999) speculated to result from sand grains being trapped between the

artefact and another object during use. Striations are present at 90°, 60° or 45° to an obtuse edge and are associated with edge-rounding. The two retouched artefacts recovered from Square Q (FS186 and FS187) appear to be well-worked, with deep scratches, internal shatters, Walner lines and Hertzian cones observed. Vernon associates these use-wear characteristics with woodworking activities (after Hardy and Garufi 1998).

All five artefacts were also found to be covered in copious plant residues characterised by quantities of macerated cellulose, minute bark fragments and orange, resinous globules with starch grains associated with a translucent milky film, frequently interspersed with fungal micro-hyphae. Identified structural elements include seeds, a plant scale and abundant raphides (including a bundle of five silicate raphides on FS153). Three sections of xylem (secondary parenchymal wall thickening) were also found, common to all angiosperms (flowering plants). These elements are consistent with use of the artefacts on cycad seeds, tubers or mangrove plants (David Doley, Department of Botany, University of Queensland, pers. comm., 1999). The use-wear and residue elements combined indicate that the glass artefacts were used for a variety of activities including woodworking and probably tuber processing.

Other remains

Charcoal was recovered from all squares, totalling 723.9g, with occasional occurrences of large pieces of blocky charcoal (Figs 13.18–13.19). Pumice, totalling 321.9g, occurs throughout the deposits but is most abundant in Squares R–S on the residual landform. Quantities of organic material were recovered from every square, totalling 9,444.5g, comprising leaf litter and roots. Non-artefactual stone was also recovered, totalling 2,305.8g, dominated by highly weathered material recovered at the base of Squares A–D.

Discussion

Excavation revealed a low density cultural deposit distributed over a large area and dating to the last 1,000 years. The lowest cultural deposits are sparse, with the most intensive period of site use occurring in the last 700 years. Fishing, shellfishing, plant food processing and stone artefact manufacturing are all archaeologically documented. In keeping with the pattern observed at other sites, the shellfish assemblage is dominated by oyster and mud ark, with other taxa making only a minor contribution. The assemblage represents resource procurement strategies focussed on intertidal and near-shore environments. In addition, the presence of small quantities of *D. deltooides* indicates that foraging strategies included all the major coastal environments in the area. The Tom's Creek Site Complex is the closest estuarine site to the open beach sites recorded along the coast adjacent to Agnes Water (see Chapter 2). The deposition of *D. deltooides* at the Tom's Creek Site Complex is coeval with dated specimens of this taxon at the Agnes Beach Midden, suggesting at least occasional movement of people and resources between estuarine and open beach environments.

The Tom's Creek Site Complex is another example of a site only established in the last 1,500 years and remaining in use into the time of European occupation. The association of bottle glass artefacts with the pre-contact Aboriginal occupation of the site demonstrates continuities in site use and knowledge about the site into the recent past. Like the Ironbark Site Complex, post-contact use of the Tom's Creek Site Complex suggests a pattern of regional continuity in land-use from around 1,000 years ago into the historical period. The presence of retouch on several glass artefacts also indicates a persistence of technological strategies from the pre-European repertoire, with such modification/maintenance techniques usually reserved for valued siliceous raw materials (e.g. chert, volcanic ash). These data point towards a pattern of regional occupational continuity from shortly before 1,000 years ago into the historical period.

Summary

Data from the Tom's Creek Site Complex display a pattern common to other sites in the region, with first occupation and significant discard of cultural materials occurring only in the last 1,000 years. Glass artefacts found on the surface of the deposits indicate continuity of use of the site into the early twentieth century, suggesting persistence of knowledge about the location as a campsite into the period of European occupation.