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SALVAGE EXCAVATIONS AT THE TOKANUI RIVER MOUTH

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Introduction

The islands and shores of Foveaux Strait have been the scene of archaeological research since the 1950s. Early work focused on moa hunting, subsistence and seasonality (Lockerbie 1959; Higham 1968; Coutts 1970; Coutts and Higham 1971; Coutts and Jurisich 1972; Higham 1976), and included some of the earliest salvage archaeology carried out in New Zealand (Park 1969). Following this period there has been little additional excavation carried out, studies for the most part being limited to examination of museum collections and material from earlier excavations (Leach and Leach 1980; Sutton and Marshall 1980; Harsant 1986). More recently, the focus has been on understanding processes affecting the survival of archaeological sites in the face of climate change and other factors (Egerton and Jacomb 2009), and processes of culture change (Smith and Anderson 2008; Jacomb, Walter and Jennings 2010). Over the past three years, investigations have been undertaken at three sites in eastern Foveaux Strait that are particularly severely threatened by coastal erosion. The last of these three sites is at the mouth of the Tokanui River, near Fortrose.

Background to the investigations

Archaeological investigations that included areal excavation, test pitting and augering, were undertaken at the Tokanui River mouth between 22 and 30 January 2011. The work was carried out as part of the Southland Coastal Heritage Inventory Project or SCHIP (Egerton and Jacomb 2009). The SCHIP programme has the aim of identifying all archaeological sites in the coastal marine environment, assessing their threats and significance, and monitoring their condition over time. Sites that are under the greatest threat of loss or damage through natural processes are prioritised for remedial action, which can include salvage excavation. The Tokanui River mouth site is the third highest

ranked site for salvage investigation, after two sites at Kahukura and Waikawa Harbour that have already been investigated.

There are three exposures in the vicinity of the Tokanui River mouth that required investigation (Figure 1). The first (F47/53) is a c.50 m exposure of cultural layers (two prehistoric and one historic) at the south end of the beach. Its ranking was determined because the exposure of materials suggested that it was relatively early and that it contained a rich array of archaeological information but that it was deteriorating rapidly. This site is especially highly threatened by wave action as a result of the loss of any protective sediments or vegetation between it and the sea, and it was considered unlikely that it would survive more than another year or two at the current rate of erosion.

The second exposure (F47/11) is situated along the east (true left) bank of the Tokanui River, on the west loop of a meandering section of the river (Figure 1). This section of riverbank is actively eroding and leaving a lag deposit of shellfish, ovenstones and flakes on the river beach. This exposure is associated with site F47/36, which lies amongst an extensive area of dunes to the south of the river, between it and F47/53. The NZAA site record form refers to at least two complete burials being found at this site, as well as a cranium and a mandible (not found in association). It appears from the site record forms that F47/36 was a new record created to distinguish one of the burials (a skeleton found in 1973 and reburied a short distance inland) from the remainder of the site. Unfortunately, later updates added new information on F47/11 to the record for F47/36. This site (F47/11) did not appear to be as severely threatened as F47/53 (the 50 m exposure) but was investigated to determine the extent and general nature of the site at the same time as the work at F47/53 was carried out.

The third exposure is at the point marked "silage pit" on Figure 1. A silage pit was excavated here by the McKenzies, who own the land and were not aware that they were disturbing a site. They are very sympathetic to archaeology and have been assisting with monitoring the condition of the eroding sites over the past year or two. During a recent visit to the site we observed charcoal-stained sediments in the spoil from the silage pit and, on closer inspection, observed a scatter of shell midden and fire-cracked rocks. A moa femur was found lying on the surface amongst the scattered material. The silage pit was full of silage at the time of our visit, and the surrounding ground was covered in a dense sward of grass, so no intact stratigraphy could be examined. However, we were reasonably confident that there would be some intact remnants of the site in the close vicinity of the silage pit. This site is almost certainly part of site F47/51, a surface exposure of scattered pipi shells and oven stones on the margins of a large hollow in the dunes. A programme

of systematic augering was undertaken here to determine whether any intact cultural deposits remained.

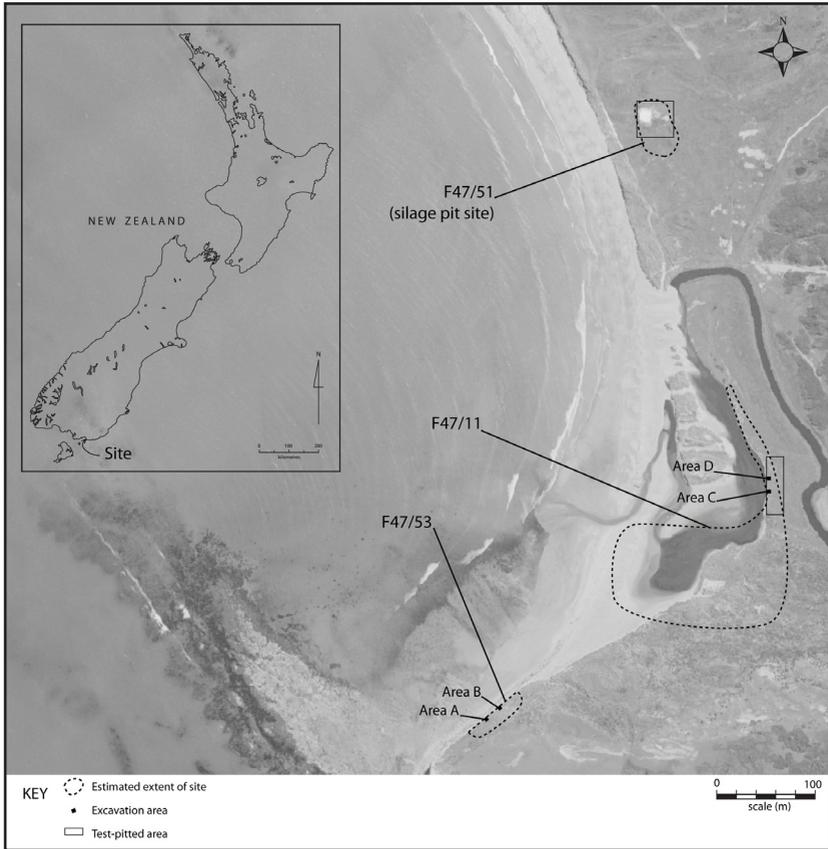


Figure 1. Tokanui River mouth showing property boundaries, locations of investigation areas (excavations, test pits and augering) and estimated extents of archaeological sites.

Archaeological investigations were carried out at the above sites between 22 and 30 January 2011 with the general objectives of addressing management and research aims by fulfilling the recommendations of the SCHIP report through salvage excavation of threatened deposits. The individual sites, along with the aims, methods and results of the investigations at each site are described below.

Site 1: F47/53*Site description*

This is a stratified site with at least three occupation layers, which extends for some 70 m along the eroding beach section at the south end of the beach at the Tokanui River mouth (Figure 2). The ground immediately inland of the site rises rapidly to a height of some 20 m above sea level. According to the landowner the site has eroded some 10-15 m in the last 20 or so years, to the point where it has all but disappeared. The occupation layers are exposed more or less continuously along the beach face, and are in a state of active erosion. There are three clearly visible layers that contain archaeological material. In the two lowest layers can be seen midden that includes shell, fish bone and bird bone in a charcoal-stained sand matrix with fire-cracked rocks. An adze of Archaic type (Duff type 1D) visible in the lowest layer along with a fragment of moa bone suggested that the initial occupation here was very early. The uppermost cultural layer contained several fragments of whale bone, along with fragments of glass and metal objects and some shell midden.



Figure 2. F47/53 beach section showing Areas A (right) and B (left) (photo: Justin Maxwell).

Research aims

The specific research questions we addressed in the field were as follows.

Stratigraphy and chronology

This stratified site presented an opportunity to investigate change through time. It was clear from the stratigraphy visible in the beach section that there were at least three occupation phases at the site, two prehistoric and one historic. An aim of the investigation was to document the stratigraphy of the site and to obtain radiocarbon dating samples in order to develop a chronology for the sequence of occupation.

Spatial patterning

Too little of the stratified site remained for a systematic investigation of spatial patterning, although our excavation units were chosen to maximise representativeness of different areas of the remaining deposit.

Subsistence practices

An important part of the research strategy was to examine the economic foundation of the Tokanui River mouth communities. The marine environment of the south coast has a higher inshore productivity and, in winter especially, has higher water temperatures than Otago. Subsistence practices and how they changed over time are a major focus of our investigations. The multi-layered stratigraphy of the site made this relatively straightforward to accomplish through standard stratigraphic excavation and sampling techniques.

Lithic resource use and movement

The work that we have been involved in over the last few years suggests strongly that the key to understanding early period adaptation and cultural change lies in understanding mobility patterns (Jacomb, Jennings and Walter 2010). The best way of monitoring this archaeologically is through the identification and sourcing of lithics from dated contexts. Southland is particularly sensitive to this type of study as it lies at the extreme end of most of the early distribution networks but is also a provider of lithic resources to those same networks.

Methods

A GIS was created to store, analyse and disseminate all spatial information and to manage other excavation data. An arbitrary 1 x 1 m grid was laid out over the site with a baseline aligned parallel to the beach face (grid north

was 30 degree east of magnetic north). Two 2 x 2 m areas, designated Areas A and B, were identified for excavation (Figure 3). These were selected on the basis of the observations of the beach section so as to obtain representative faunal material through each occupation level. Excavation was undertaken by hand, using trowels according to natural or cultural stratigraphy or in 50 mm spits where the layers were thicker than 50 mm.

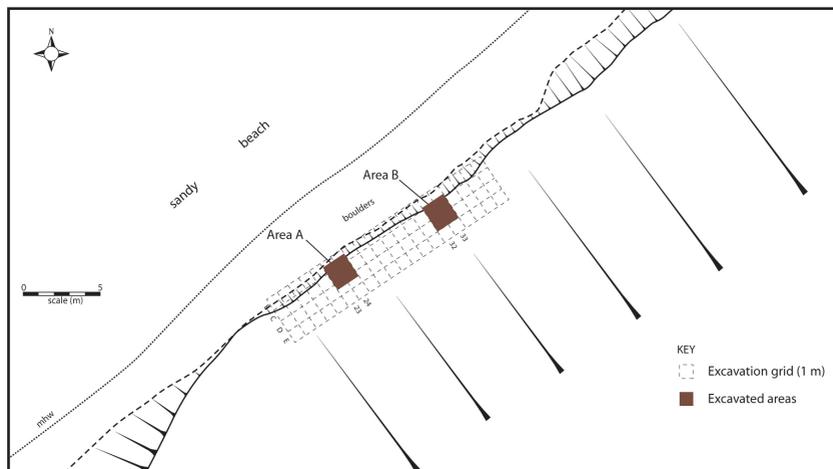


Figure 3. Site F47/53 showing excavation grid and location of excavated areas.

To obtain a representative faunal sample all midden-containing sediments from two 1 x 1 m column samples were sieved (wet sieved using 3.2 mm screen size). All material remaining in the screens was returned to the Otago Archaeology Laboratories (OAL) at the University of Otago for analysis using standard archaeozoological methods (e.g. Reitz and Wing 2008). All remaining sediments were excavated in 50 mm spits and wet-sieved through a 6.4 mm screen. All of the material returned to the OAL was washed, dried and sorted to basic class (mammal, bird, fish and reptile), and any artefacts removed and bagged. The column samples have been further subjected to detailed analysis which is currently under way and will be reported on later.

Sufficient radiocarbon samples were recovered from the site to address the basic chronological objectives.

Results

Stratigraphy

As expected from the records made of the visible beach section, the site was made up of three occupation layers and intervening sand layers, described as follows:

- Layer 1. Sterile overburden of clean sand with a poorly developed topsoil approximately 8 cm deep. This layer varied between 100 and 500 mm in depth.
- Layer 2. Dark grey, charcoal-stained sand with some banding. Fragments of broken glass, including case gin bottle fragments, metal (possibly hoop iron) and several pieces of whale bone. This layer varied in thickness between 200 and 700 mm.
- Layer 3. Dense midden with shell, fish, bird, dog, sea mammal, charcoal and fire-cracked rocks in a dark grey charcoal-stained matrix. This layer was up to 30 mm thick.
- Layer 4. Clean mid-grey sand with very sparse shell midden. This layer varied between 50 and 500 mm in thickness.
- Layer 5. Dense midden with shell, and the bones of fish, bird (including moa and penguin), dog and sea mammal (including whale). Moa egg shell fragments were found at the base of the layer. This layer varied between 50 and 300 mm in thickness. In Area A it was 250-300 mm thick but in Area B it was only about 50 mm thick and contained charcoal-stained sand but no midden.
- Layer 6. Dense, clayey yellow-grey loess deposit some 500 mm thick.
- Layer 7. Water-rolled cobble layer in a loose, coarse grey-brown sand matrix.

Radiocarbon dates

Seven samples were selected for radiocarbon dating, two of marine shell, selected before excavation began, and five of charcoal. At the time of writing, only the marine shell results have been received (Table 1).

Table 1. Preliminary radiocarbon results from Tokanui River mouth.

Provenance	Lab No.	CRA (BP)	Cal AD		d13C
F47/53 L2	Wk30107	403 +/- 29	1 σ	1443AD (62.5%) 1490AD	-25.6 +/- 0.2
				1603AD (5.7%) 1610AD	
			2 σ	1435AD (79.6%) 1522AD	
				1575AD (1.2%) 1584AD	
				1590AD (14.6%) 1624AD	
F47/53 L4	Wk30108	540 +/- 29	1 σ	1329AD (13.1%) 1340AD	-25.9 +/- 0.2
				1396AD (55.1%) 1427AD	
			2 σ	1318AD (28.3%) 1353AD	
				1390AD (67.1%) 1436AD	

Radiocarbon dates calibrated with OxCal v4.1.7 ©Bronk Ramsey (2010); r:5; using atmospheric data from Reimer et al (2009); Marine09 Curve(Marine09.14c); marine data from Reimer et al (2009); delta-R site to -7 ± 45 .

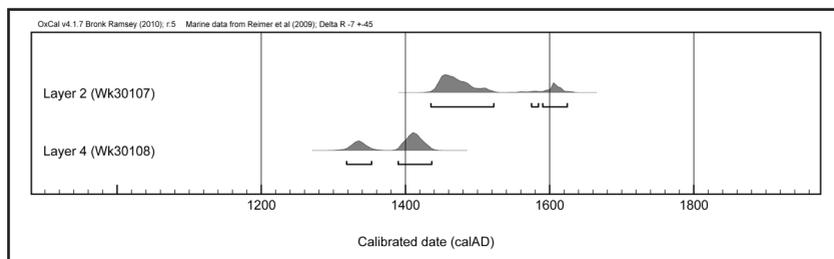


Figure 4. Calibrated radiocarbon dates from the Tokanui River Mouth (marine shell).

Features

It was not expected that many features would be revealed during the investigations because of the relatively small areas opened. The depth of the stratigraphy (up to approximately 2 m below the ground surface) meant that it was only practicable to open up two 2 x 2 m areas (Areas A and B). The features encountered are described below.

Area A

The only features encountered in Area A comprised a sandy hollow in

the upper surface of Layer 3 that contained a cache of two adzes (Figures 3 and 5) and, in Layer 3 itself but intruding into Layer 2, an alignment of small (5-10 kg) boulders. The adzes were lying one on top of the other at about a 45 degree angle from the horizontal, with the cutting edges upward (Figure 5).



Figure 5. Adze cache in situ in Area B, Layer 3, looking east.

Area B

In this area a densely stone-packed oven was found in the lower part of Layer 2 (Figure 6).

A few metres north of Area B a cache of worked bone (Figures 7 and 8) was visible in the eroding beach section (Layer 5). These were recovered from the section and returned to the OAL.

Material culture

A relatively small number of artefacts was recovered from the site. The majority of them came from Area A, and they included both historic and prehistoric items.

Area A

A small number of historic artefacts was found in Layer 2, including a broken but complete pale green bottle with applied top and oval-sectioned body (Figure 9) and several rusted metal objects that have the appearance of hoop iron.



Figure 6. Oven found in Area B, Layer 3, looking south.



Figure 7. Cache of moa and whale bone found in the beach face near Area B.



Figure 8. Fragments of bone, some worked (moa at top and centre right, whale at centre left and bottom) found in a cache in Layer 5 in the eroding beach face just north of Area B.



Figure 9. Bottle, Area A, Layer 2.

In Layer 3 the cache of two adzes was found in a sand-filled hollow in the NW quadrant of the area (Figure 5). Both appear in hand-specimen examination to be made in Bluff argillites. The larger of the two is a tanged quadrangular adze with butt reduction on the lateral margins (Duff Type 1B). It is hammer-dressed and polished on all surfaces. There is a small chip out of the cutting edge that has become rounded through abrasion indicating that the damage occurred before it was cached in the ground. The smaller example is a rounded quadrangular adze without butt reduction (closest to a Duff Type 2A). Both adzes were manufactured using percussion technology then finished off with hammer dressing and grinding. The sandy hollow was otherwise completely sterile.

The remainder of Layer 3 comprised a dense deposit of midden. Several artefacts were found in this layer, including a fragment of a small flaked and polished quadrangular adze, an oyster shell pendant, a possible schist file and a cobble spall with a ground cutting edge (Figures 10 and 11, Table 2).



Figure 10. Oyster shell pendant found in F47/53 (Area A, Layer 3).

Layer 4 was a sterile sand layer that contained no artefacts. Layer 5 had a single chert flake and, at the very base of the layer, a small deposit of moa eggshell.

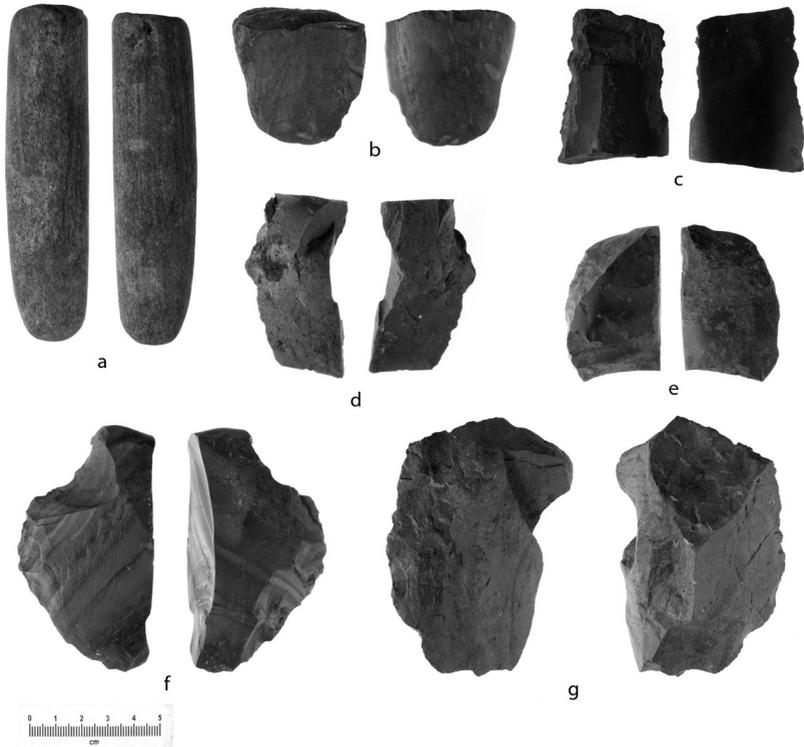


Figure 11. Other artefacts from F47/53 and F47/11.

Area B

A more restricted range of artefacts was recovered from Area A. Layer 2 contained a broken bottle (dark green 'square gin'), two buttons of copper alloy embossed "Best Ring Edge" (Figure 12), several indeterminate fragments of rusted metal and several fragments of worked whale bone. From Layer 3 we recovered a chert flake tool and a fragment of a polished adze that had been reworked.

Fauna

Approximately 0.5 m³ of midden (sieve contents after sieving through 3.2 mm screen) was excavated from Areas A and B and returned to the OAL for analysis. The analysis of this material is not yet complete, but it is possible to make some comment on the faunal contents on the basis of observations made

during excavation. The midden is dominated by marine shellfish, mostly blue mussel (*Mytilus edulis*) and pipi (*Paphies australis*) but also with catseye (*Turbo smaragdus*), Cooks turban (*Cookia sulcata*) and some paua (*Haliotis spp.*) and oyster (*Ostrea spp.*). Also, several fragments of moa bone – most of which were probably industrial – and whale bone were found (including a vertebra of what appears to be a pilot whale), along with bird, dog and sea mammal.



Figure 12. Two copper alloy buttons embossed with “Best Ring Edge” found in Area B, Layer 2.

Site 2: F47/11

Site description

This site was visible as a thin, discontinuous lens of charcoal-stained soil and sparse midden, with two slightly denser sections, that extended some 50 m along the true left bank of the Tokanui River about 100 m upstream from the point where the river flows out onto the sandy ocean beach (Figure 14). The river flows parallel to the sea at this point, separated from the sea by a band of sand dunes. The sand dunes appear to be moving inland, forcing the river to erode its landward bank, exposing and damaging archaeological deposits.

Table 1. Provenience details of artefacts found during investigations at the Tokanui River mouth.

Provenience (Area-Square-Layer-Spit)	Item	Figure reference
A-D23-2-i	Bottle base (pale green, oval section body, app. rim)	Figure 9
A-D23-2-i	Bottle top (pale green)	Figure 9
A-C24-3-I (Feature X)	Adze (cache, Duff type 1B)	Figure 13(L)
A-C24-3-I (Feature X)	Adze (cache, Duff type 2A)	Figure 13(R)
A-C23-3-ii	Pendant (oyster shell)	Figure 10
A-C23-3-ii	File(?) (schist)	Figure 11(a)
A-C23-3-iv	Polished stone fragment	Figure 11(b)
A-D24-3-iv	Adze fragment	Figure 11(c)
A-C23-5-ii	Flake (chert)	Figure 11(d)
A-C24-5-ii	Moa eggshell	NA
B-C32-2-i	Buttons (copper alloy “Best Ring Edge”)	Figure 12
B-B33-2-1	Bottle glass (dark green square gin)	NA
B-B32-3-ii	Flake tool (chert)	Figure 11(f)
B-C32-3-iii	Adze fragment reworked	Figure 11(e)
B-B33-5	Flake (chert)	Figure 11(g)
D-A12-2-i	Adze	Figure 15
B-B35-j	Bone cache (whale and moa)	Figure 7

This site is recorded as including areas of deflated ovens and middens amongst dunes south of the river mouth (in which the remains of up to four human burials were found, one of which was reinterred in 1973) and a midden and cooking area eroding on the western edge of the hairpin bend in the river.



Figure 13. Adze cache found in F47/53 (Area A, Layer 3).

Research aims

The main aim of the investigations at this site was to determine the extent of the site but, since there were two small concentrations of midden visible that were threatened by the erosion processes acting on the site, we opened two small areas (2 x 2 m and 2 x 1 m) adjacent to them with the aim of recovering suitable material for faunal analysis and radiocarbon dating.

The majority of this site appears to have eroded away. At the request of iwi we carried out some test pitting in the interior of the hairpin bend and sampled the eroding midden for faunal analysis and radiocarbon dating.

Methods

In broad terms, the recording and investigation methodology was the same as for the first site. Two 2 x 2 m excavation units were selected in order to recover representative faunal samples from this site and to allow radiocarbon dating samples to be collected. One of these was only half excavated (2 x 1 m) because of the paucity of material present. These were excavated in 50 mm spits and, because the midden deposits were relatively modest, all material was wet-sieved in the river using a 3.2 mm screen size and all material remaining in the sieves was returned to the OAL for analysis.

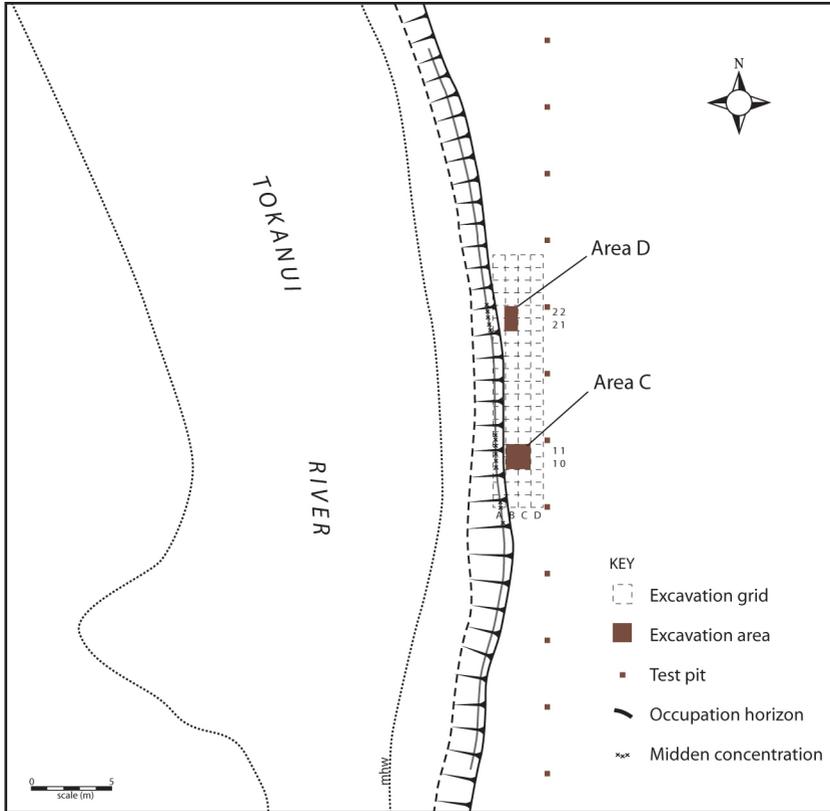


Figure 14. Site 2 (F47/11) showing visible cultural layer and location of archaeological investigations.

Results

Stratigraphy

The stratigraphy in this area was very simple, as follows:

- Layer 1. Clean grey sand layer with a very poorly developed topsoil (0~200 mm below surface).
- Layer 2. Shell midden layer in a light grey sandy matrix, charcoal-stained in places (~200-250 mm below surface).

Layer 3. Clean grey sand layer with some small water-rolled pebbles, extending from midden layer to river level (~250-1500 mm below surface).

Features

No features were encountered during the excavations in Area C or D.

Material culture

A relatively large adze, in a style of which the closest Duff type is 4A, was found in Area D, Layer 2 (Figure 15). In addition, several flakes of chert were found in both areas (e.g., see Table 1, Figure 13).



Figure 15. Adze found in F47/11 (Area D).

Fauna

The faunal analysis is currently in progress.

Site 3: F47/51

Site description

This site was visible as a surface scatter of shell, charcoal, artefacts and bone – including moa – in the spoil that had resulted from the excavation of a silage pit on the property of Colin and Christine McKenzie. It appears to have been excavated very close to an earlier silage pit. The aim of investigating this site was simply to determine the extent and general condition of the site, including how much of it might still remain intact.

The discovery of a moa bone in likely association with archaeological deposits is significant as moa remains are relatively scarce in Southland sites. The silage pit site had not been identified as early during previous surveys and is therefore an important addition to the record for Southland. However, almost nothing is known of the site – including whether or not any of it remains intact.

To address this lack of information we used a 50 mm auger to sample the ground around the perimeter of the silage pit at approximately 5 m intervals. We sampled at closer intervals where necessary to determine the extent of the site. The method allowed us to determine the extent of the site, the depth of deposits and whether or not there was more than one layer in the site.

Results

Twenty auger holes were bored in a pattern that radiated from the edges of the current silage pit. Only one resulted in the recovery of any occupational evidence. This was in the form of a 75-80 mm thick layer of charcoal-stained sand that was found at a depth of 1.6 m below the surface. Its location was 1 m west of the current silage pit, in a narrow band of undisturbed sand dune that separates the two silage pits. It is concluded that the site has been effectively destroyed by the excavation of the two silage pits.

We attempted to recover suitable material for radiocarbon dating but were not successful.

Discussion

The investigation succeeded in all of its objectives. The two 2 x 2 m areas in site F47/53 were excavated to the natural subsoil and this resulted in the recovery of a range of significant cultural material from three separate occupation phases. The base layer (Layer 5) contained moa bone and eggshell and is therefore representative of the first century or so of settlement of New Zealand by Polynesians. The relatively early type adzes found in Layer 3 suggest that this layer represents an occupation that also took place relatively

early in the prehistoric sequence. The two preliminary radiocarbon dates are consistent with this interpretation although the remaining dates will provide a much fuller picture.

A statistically useful collection of faunal material was recovered from the site and this will allow a reconstruction of diet and of foraging practice at the Tokanui River mouth in the early centuries of settlement. The investigation also allowed an assessment of how much of the site remains. It is clear that the site does not extend much beyond 2 m from the current beach face, as was anticipated based on the profile of the adjacent hill slope. It appears likely, from discussions with local people including the current owner of the adjacent land, that approximately 90% of the site has been destroyed over the last 20 years by erosion. Approximately 20% of the remaining site was removed during the current excavations.

In site F47/11 a much smaller volume of material was excavated, but the adze found here, which is of a type that was used early in the prehistoric sequence, suggests that the occupation of this site was – if not contemporaneous with that of F47/53 – at least broadly from the same time period. A total sample of faunal material was returned to the OAL for analysis, and this will provide the bulk of the information that will be gained from this site. The test-pitting in the vicinity of this site showed that it is all but destroyed and that no further investigation is warranted here.

At site F47/51 the augering showed that this site, too, is effectively destroyed and that no further investigation is warranted. The material found scattered on the surface in the vicinity of the site, which included a moa bone and flakes of Southland argillite, suggests that the site, like the others described here, was occupied early in the New Zealand prehistoric sequence and can be considered roughly contemporaneous with the other two sites.

All artefacts found during the excavations have been registered with the Ministry for Culture and Heritage. Any additional artefacts found during the laboratory analysis will be registered as soon as the analysis has been completed. The investigations were carried out under Historic Places Act authority 2011/232.

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