ARCHAEOLOGY IN NEW ZEALAND

NEW FISH RECORDS FROM AN ARCHAIC MIDDEN SOUTH ISLAND

Marshall I. Weisler[1], Chris Lalas[2] and Paul Rivett[1]
[1] Department of Anthropology, University of Otago, Dunedin
[2] Box 31, Portobello

Introduction

Recent summaries of prehistoric fish catches in New Zealand have emphasised regional differences which generally include the dominant use of snapper in the northern North Island and barracouta in the southern South Island (Anderson 1997; Leach and Boocock 1993). While we do not argue with these interpretations of the data at hand, we do wonder how different field and lab methods may change our understanding of prehistoric fishing subsistence. We describe the results from excavations at an Archaic South Island site where cultural deposits were sieved with 6 and 3 mm screens and all faunal material was retained and identified. True, recent excavations at Shag Mouth reported using 1/8" (3.2 mm) sieves (Smith and Anderson 1996:70), but only "diagnostic" bones were collected, a fact lamented by Davidson (1997:186). We report here fish identifications based on the usual five-paired mouth bones, which is standard practice in New Zealand archaeology, but also include otoliths—millimetre-sized specimens that consist of calcium carbonate in the crystalline form of aragonite and, consequently, tend to preserve well in a range of sedimentary contexts (see Weisler 1993 for an extended discussion of otoliths with numerous specimens illustrated).

During two field seasons at the Archaic site of Kakanui (Weisler 1998; Weisler et al. 1998; Weisler and Somerville-Ryan 1996), field methods were expressly designed for recovering small classes of artefacts and faunal materials that are routinely missed by using screens with mesh sizes >3 mm. How does screen size influence the recovery of identifiable fish bones and otoliths?

Background and Methods

The Kakanui site (J42/4) is located about 100 km north of Dunedin and just a of couple kilometres farther north than the Kakanui River mouth. Located in the lee of Cat's Eye Point, the site is situated on a sandy dune that covers about 2500 m^2 today, but was formerly larger, having been subjected to at least five centuries of coastal erosion. During one week in 1996, and again in 1997, excavations were concentrated near the wave-cut cliff edge. The site boundaries were delimited by an east-west transect line (Fig. 1, especially units 8, 9 and 10) and an exposed cultural deposit about 50 m north of the coast.

A total of 41.5 m^2 was excavated with all sediments screened with 6 mm sieves; 23 m^2 (55%) were also sieved with 3 mm (Fig. 1) and large bulk samples (weighing up to 3 kg each) were collected for sieving with 2 mm screens. In the field, material retained in the 6 mm size class was sorted into formal artefacts, debitage, bone (including otoliths), shell and charcoal and bagged separately to avoid breakage and facilitate lab work. All sediments retained in the 3 mm sieves were bagged and returned to the lab at the University of Otago where the material was water-sieved, dried and sorted under more controlled conditions. Because Stage 4 students from an archaeological methods class were the primary labour, all sorting was checked in the lab. Sorting of the 2 mm size class was accomplished with a binocular scope under 8x magnification.

Fish otoliths, as well as fish bone, were sorted from all sieve size classes and identified to lowest taxonomic level by Paul Rivett. Otolith identifications were checked by Chris Lalas with the aid of an extensive reference collection of New Zealand otoliths.

Results

Table 1 lists fish identified by otoliths from the Kakanui site compared with prehistoric fish catch data summarised recently for the southern South Island (Anderson 1997; Leach and Boocock 1993). The details of recovery bias, sampling and implications for New Zealand fish studies will be discussed elsewhere. However, here we identify 14 species of fish *never before found in New Zealand middens*. Of particular interest are the species identifications of such food fish as Rock cod, Hake, Hoki, Witch and Lemon Sole.

Note also that otoliths add significantly to the overall quantity of identified bones whether tabulating by MNI (minimum number of individuals) or NISP (number of identified specimens). For example, the Kakanui site has an MNI of 414 of which *only 18.5% are accounted for by fish bones*. Likewise, NISP

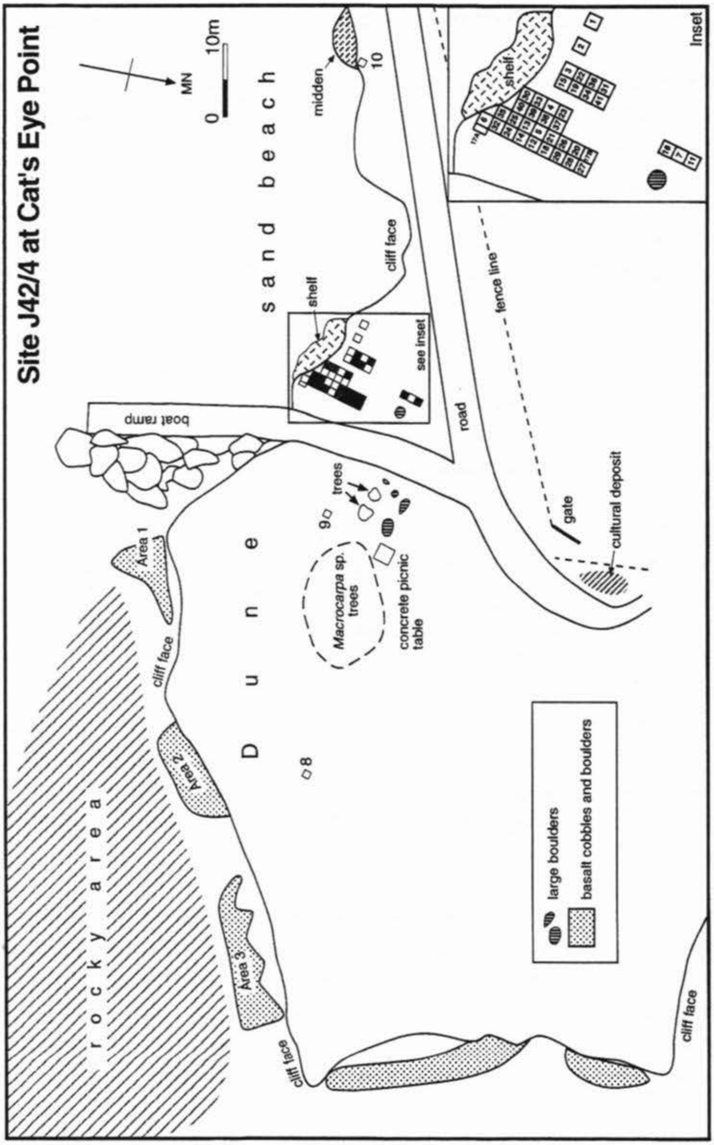

Figure 1. The Kakanui site delimited east-west by unit 10 and the boat ramp, then inland to the area marked "cultural deposit". Sediments from shaded units were sieved with 6 as well as 3 mm screens.

increases 27% when otoliths are added to the fish bone identifications.

Species diversity at the Kakanui site also significantly increases from only five taxa represented by bones to 27 taxa when otoliths are included—*this is a five-fold increase*.

Anderson (1997) and Leach and Boocock (1993) have both commented on the high proportion of barracouta in southern South Island sites. In fact, it is almost always the dominant taxon by far. However, when the cultural deposits at Kakanui are fine-sieved and all bones and otoliths are identified, barracouta accounts only for 28 MNI, while 341 Red cod otoliths were recovered. We are left asking why is this the case at Kakanui, but not at other sites in the southern South Island?

Summary and Conclusions

The systematic use of fine sieves, total collection of cultural material retained and sorting under laboratory conditions has added significantly to the recovery of prehistoric fish bones and otoliths from an Archaic South Island midden. Although the procedures used at Kakanui are labour-intensive, results suggest that it is worth the additional expenditure of time and resources. We make the following points:

1. In the example of Kakanui, species diversity increased five times when otoliths were added to the analysis. Consequently, the details of uniformity and regional variation of fish catches from prehistoric New Zealand (Anderson 1997) can be assessed more accurately when otoliths are recovered from archaeological sites.

2. Are barracouta the dominant taxon at Archaic southern South Island sites? Although we report that Red cod is overwhelmingly the most abundant taxon at Kakanui, other sites, excavated and sieved in a similar manner, may yield results that closely parallel those we report here. Red cod is also the dominant taxon at many sites in the Nelson area where 4 mm-size sieves were used (Ian Barber, personal communication, 1998).

3. To those that use MNI from excavated samples for extrapolating the contents of an entire site, otoliths must be considered in these estimates. At Kakanui, five times as many fish are represented when otoliths are added to the quantification measures.

4. Did prehistoric Maori fish in the deep water for Hoki? The only answer we can give here is a qualified "maybe". In fact, we don't believe that all the otoliths recovered from the Kakanui site represent prehistoric fish catches by people. Some could have arrived at the site as gut contents of sea mammals and sea birds. However, careful examination of each otolith under magnification revealed only a few examples with the typical rounding and erosion normally associated with otoliths that pass through a digestive tract. If one argues that sea mammals are solely responsible for the otoliths found in middens, why are otoliths present in archaeological sites in Hawai'i, the Pitcairn group and the Marshall Islands? Even if sea mammals are responsible for many of the otoliths found in coastal New Zealand middens, we should still strive to understand the taphonomy and site formation processes of all materials recovered from archaeological sites.

We hope that future excavations in New Zealand will be mindful of the results presented here. Bulk sediment samples currently housed at universities and museums should be one place to check for otoliths from previously excavated sites. If we pay closer attention to the "ones that got away", our understanding of prehistoric fishing in New Zealand will only improve.

Acknowledgments

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Table 1. Prehistoric fish catch records for the southern South Island compared to Kakanui

Taxon		Anderson (1997) 5-paired	Leach and Boocock (1993) 5-paired	Weisler et al. (this paper) 5-paired	otoliths
Shark/Ray	Elamobranchii		16		
Eel	Anguilla sp.	1	1		
Eel	Conger sp.		6		
Eel	Conger verreauxi		37		2 (3)
*Silver Conger Eel	Gnathophis habenatus				13 (26)
*Silverside	Argentina elongata				1 (1)
*Ahuru	Auchenoceros punctatus				5 (10)
Red Cod	Pseudophycis bacchus	404	1099	45 (219)	341 (430)
*Southern Bastard Cod	Pseudophycis barbata				1 (1)
Northern Bastard Cod	Pseudophycis breviuscula		1		
Rock Cod	Lotella sp.	1			
*Rock Cod	Lotella rhacinus				1 (2)
*Hake	Merluccius australis				1 (2)
*Hoki	Macruronus novaezelandiae				11 (22)
*Oblique Banded Rattail	Coelorinchus aspercephalus				8 (15)
*Two Saddle Rattail	Coelorinchus biclinozonalis				3 (6)
Ling	Genypterus blacodes	54	391	1 (1)	7 (14)
Scorpion Fish	Scorpaena cardinalis	7	12		
Scorpion Fish	Scorpaenidae		405		
Sea perch	Helicolenus papillosus	5			
Sea Perch	Helicolenus				2 (4)
Red Gurnard	Chelidonichthys kumu	3	2		1 (2)
Groper (Hapuku)	Polyprion oxygeneios	23	74	1 (1)	1 (1)
Jack Mackerel	Trachurus declivis	1	1		
Jack Mackerel	Trachurus novaezelandiae		17		
Jack Mackerel	Trachurus sp.				1 (1)
Jacks	Carangidae				
Snapper	Chrysophrys auratus	2	10		
Marblefish	Aplodactylus arctidens	4	1		
Tarahiki	Nemadactylus macropterus	5	191		
Blue Moki	Latridopsis ciliaris		9		
Trumpeter	Latris lineata	23	52		
Yellow-eyed Mullet	Aldrichetta forsteri	1			1 (2)
Wrasses	Pseudolabrus spp.	105	1319		
Butterfish	Odax pullus	2	19		
Giant Stargazer	Kathetostoma giganteum		4		1 (2)
*Sand Stargazer	Crapatalus novaezealandiae				1 (1)
Esturary Stargazer	Leptoscopus macropygus				1 (1)
*Opalfish	Hemerocoetes artus				1 (1)
*Opalfish	Hemerocoetes pauciradiatus				2 (3)
Blue Cod	Parapercis colias	120	614		1 (2)
Black Cod	Notothenia spp.	35	56	2 (14)	
Barracouta	Thrysites atun	1323	5376	28 (200)	3 (6)
Gemfish	Rexea solandri	5	1		
Common Warehou	Seriolella brama		5		
Blue-nose Warehou	Hyperoglyphe antarctica	1			
*Witch	Arnoglossus scapha				1 (1)
Flounders	Rhombosolea spp.		3		
Flounders	Peltorhampus novaezeelandiae		7		
Sole	Peltorhampus				1 (2)
*Lemon Sole	Pelotretis flavilatus				2 (3)
Leatherjacket	Navodon convexirostris		7		
Total counts MNI and (NISP)		2125	9736	77 (435)	414 (564)
Number of sites		9	42	1	1

* = New records for New Zealand.

Fish taxa after Ayling and Cox (1982)