

Farmers, Fishers and Whalers



The colonisation landscapes of Lord Howe Island, Tasman Sea, Australia

**Kimberley Ann Owens (BSocSci, Hons)
April 2008**

**A thesis submitted for the degree of Doctor of Philosophy of the
Australian National University**

Statement of Authorship and Sources

Declaration

I declare that this thesis describes original research carried out by myself and has not been submitted in any other form for another degree or diploma at any other university or other institution of tertiary education. Where other individuals have provided expert input, they are acknowledged specifically in the relevant sections of the text. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

Kimberley Ann Owens

Date

Statement of Access

Declaration

I, the undersigned, the author of this thesis, understand that the Australian National University will make it available for use within the university library and, by microfilm or other means, allow access to users of other approved libraries. All users consulting this thesis will have the sign the following statement:

In consulting this thesis I agree not to copy or closely paraphrase it in whole or in part without the written consent of the author; and to make proper public written acknowledgement for any assistance that I have obtained from it.

Beyond this, I do not wish to place any restriction on access to this thesis.

Kimberley Ann Owens

Date

Acknowledgements

There are so many individuals and organisations have contributed to the undertaking of this PhD, that individual thanks would be lengthy and still inadequate in many ways. A special thanks to my friends and family for their understanding, tolerance and support during the ridiculous amount of time taken to complete the project and my various periods of non-communication and hermit-like existence. Similarly, great thanks and appreciation to my supervisor Atholl Anderson for his advice and patience; and to Sharon Donohue for her great patience with overdue paperwork and the like. Also much appreciation to Pim Allison for her input and the opportunity to get a better handle on historic artifact assemblages. A great thanks to many community members from LHI without whom the project could not have gone ahead, my field volunteers who gave their time freely at considerable personal expense, and to many professionals at ANU and elsewhere who have happily given their time and expert opinion on various big and little things. In full acknowledgement that lists are inadequate, nonetheless the following people receive my thanks for the many big and small favours, tasks and mini projects they have willingly taken on for my benefit – thank you all.

Department of Archaeology and Natural History, RSPAS, ANU Staff and Students

Professor Atholl Anderson

Dr Sue O'Connor

Dr Mike McPhail

Mr Paul Brugman

Mr Darren Boyd

Ms Janet Finn

Ms Sophie Collins

Dr Mattieu Prebble

Mrs Sharon Donohue

Department of Archaeology and Anthropology, ANU Staff

Dr Pim Allison

Professor Colin Groves

Field Staff

Ms Zandria Farrell

Mr Thomas Harvey

Mr Julian Travaglia

Mr Hugh Watt

Lord Howe Island Board Members and Staff

Mr Esven Fenton

Mr Gower Wilson

Mr Bruce McFadyen

Mrs Judy Riddle

Mr Sean Thompson

Mr Terry Wilson

Mr Geoff Kelly

Mr Gary Millman

Christo and work crew

Lord Howe Island Museum Committee and Staff

Mr Chris Murray

Mr Ian Hutton

Mrs Robyn Warner

Mr Barney Nichols

Lord Howe Island Community Members

Mr Brian Busteed

Mr Peter Busteed

Mr Jim Fitzgerald

Mrs Ysobel Heffernen

Mr Ian Lucas

Ms Daphne Nichols

Mr Peter Phillips

Mrs Ilma Sainsbury

Mrs Cindy Shick

Mr Ray Shick

Mr Barry Thompson

Mr Des Thompson

Mr Michael ThompsonMr Jim Whistler

Mrs Lois Whistler

Mrs Thelma Wilson

Ms Rhonda Wilson

Mrs Annette Young

Mr Brian Young

National Parks and Wildlife Service Staff

Dr Rodney Harrison

Library staff at the Hurstville Office

New South Wales Heritage Office Staff

Ms Isabel Cobas

Dr Siobhán Lavelle

Dr Timothy Smith

Sydney Harbour Foreshore Authority Staff

Dr Wayne Johnson

Casey and Lowe Pty Ltd

Dr Mary Casey

Sydney University Staff

Dr Martin Gibbs

University of Manchester Staff

Dr Eleanor Casella

University of Durham Staff

Dr Keith Dobney

Abstract

A small dot of land in the middle of the Tasman Sea, Lord Howe Island presents an interesting and unique opportunity to examine several archaeological and historical questions relating to the colonization of islands, settlement landscapes, and the development of isolated communities. Through a combination of historical research and archaeological investigation, this project seeks to investigate the processes of development and change that were operating in the LHI settlement landscape and to arrive at an understanding of how these processes may or may not have significance for the understanding of other island colonization events, particularly prehistoric ones. Extensive background historic research utilizing various published and unpublished sources; community consultation and gathering of local knowledge; surveys of six historically known sites and excavation of four; and the synthesis of the historic and archaeological data in the creation of settlement landscape maps and identifications of resource use over time were employed as mechanisms of understanding the processes of colonization on a Pacific island, and allowed an assessment of its usefulness as an analogue for similar historic and prehistoric scenarios. The consequential thesis that is presented here outlines these research tasks and results and culminates in the general conclusion that Lord Howe Island is both a useful example and comparative case for other studies while paradoxically being subject to its own unique historic context, and is therefore limited to useful generalities rather than specifics.

Contents

Statement of Authorship and Sources.....	i
Statement of Access.....	i
Acknowledgements.....	ii
Abstract.....	iv
List of Figures.....	vii
Chapter One - “...this quiet, isolated, but picturesque little spot”:	
Project Overview.....	1
• Study Area.....	2
• Climate.....	5
• Geology.....	5
• Flora and Fauna.....	7
• Historical Overview.....	12
• Management and Heritage Listings.....	13
• Previous Studies.....	14
• Research Questions and Aims.....	16
• Methodology.....	17
• General Progression of Thesis.....	20
Chapter Two - Physical, Historical and Cultural Islands:	
Research Background.....	21
• Landscapes: constant yet ever-changing, ephemeral yet pervasive.....	22
• Island Colonisations: voyages of discovery and change.....	25
• Colonisation Impacts in Polynesia: hunters, gatherers, farmers and fishers.....	28
• European Island Colonisations in the Pacific: patterns of colonial change.....	37
• Pioneers and Plunderers: whalers and sealers in the Pacific in the 19 th century.....	46
• Isolation: agent of change, adaptation, stability and stagnation.....	52
Chapter Three - From Cook to Hitler and Beyond:	
Historical Context.....	56
• Discovery and Descriptions.....	56
• South Sea Whaling.....	61
• First Settlers.....	66
• Second Wave Settlement.....	71
• Growing Settlement and Whaling Decline.....	75
• Tertiary Settlement Infrastructure and the Development of the Palm Industry.....	83
• Development of Tourism and the End of Isolation.....	86

Chapter Four - Buried Lives: Archaeological Investigations	90
• Hunter Bay	92
• North Bay	112
• The South End.....	124
Chapter Five - Everyday Chattels and Sunday Dinners: Artefact and Midden Analysis	150
• Classification System	151
• Other Analyses	154
• Old Settlement Beach Foreshore.....	155
• Perry Johnson’s Land.....	184
• Early versus Middle Settlement: constants and changes from OSBF to PJJL	211
Chapter Six - From Birth to Maturation: Settlement and Resource Maps	214
• Pre 1788 Bird Distribution	216
• First Settlement: 1834	221
• Second Wave Settlement: 1841	223
• Enterprise Expansion: 1844	225
• New Partnerships: 1847	227
• Independent Enterprise: 1848	229
• LHI Under Scrutiny: 1853	231
• Continuing Prosperity: 1858	236
• Slow Decline: 1868	239
• Lowest Ebb: 1878	246
• Commissioner’s Visit: 1882.....	251
• Growing Maturity: 1891	256
• End of Isolation and New Economic Frontiers: 1900.....	261
• Rats and 20 th Century Resource Exploitation: pre 1980 bird distribution	266
• Success in the Age of Conservation: present day bird map.....	267
Chapter Seven - “...this once much frequented and favoured little spot”: Conclusion	272
• The Late Arrival: the colonisation of LHI	272
• Is Lord Howe Really An Island?.....	281
References	282
Appendices	See attached CD

List of Figures

Chapter One

Figure 1.1:	Lord Howe Island in relation to Australia and New Zealand	3
Figure 1.2:	Lord Howe Island Group, including Ball's Pyramid	3
Figure 1.3:	Lord Howe Island showing contours, settlement bounds and roads and tracks	4
Figure 1.4:	Present day and extinct breeding land and sea birds of the LHI group.....	10

Chapter Three

Figure 3.1:	After White's 1835 map, showing the Ashdown Bishop and Chapman's huts in Hunter Bay and their garden behind the Blinkenthorpe Beach dune	68
Figure 3.2:	Foulis' 1851 memory map of cleared land and 'settlements' on LHI, including the source of permanent water at Big Creek	76
Figure 3.3:	After Denham's 1853 map showing Andrew's, Mosley's and Wright's farms, the major water source and Big Creek and several unlabeled settlement areas	77
Figure 3.4:	Table showing the first year that primary sources mention crops and economic animals being present on Lord Howe Island	79
Figure 3.5:	Table showing the dates of introduction of major economic and feral animals and birds on LHI.....	80

Chapter Four

Figure 4.1:	Location of the six research sites	91
Figure 4.2:	After White's 1835 map showing the location of Ashdown, Bishop and Chapman's five huts in Hunter Bay, and agricultural gardens behind Blinkenthorpe Beach in December 1834	93
Figure 4.3:	After Foulis' 1851 memory map showing 'settlements' in Hunter Bay during his residence from 1844 to 1847	94
Figure 4.4:	2003 GPS survey sketch of OSBH 'site' showing clearance line.....	96
Figure 4.5:	Survey of area A on OSBH showing profile and shovel test locations	97
Figure 4.6:	Survey of area B on OSBH	97
Figure 4.7:	Profile 1 of OSBH showing an unremarkable even slope.....	98
Figure 4.8:	Profile 2 of OSBH again showing an unremarkable even slope over..... a greater distance	98
Figure 4.9:	Profile 3 of OSBH.....	99
Figure 4.10:	Profile 4 of OSBH running across profiles 1, 2 and 3 showing no remarkable features	99
Figure 4.11:	2003 GPS survey sketch of OSBF showing series of conspicuous mounds along foreshore directly behind dune and present day fence line.....	101
Figure 4.12:	After Denham's 1853 map showing two settlements in Hunter Bay.....	101
Figure 4.13:	Survey of OSBF showing profiles, shovel test pits and excavation squares. Note the second fence running at right angles to the foreshore fence, which is a new installation since the 2003 GPS survey.....	103
Figure 4.14:	Profile 1 of OSBF showing the second and third mounds from the left recorded in 2003	104

Figure 4.15:	Profile 2 of OSBF showing the fourth, fifth, sixth and seventh mounds from the left recorded in 2003 (indicated by arrows).....	104
Figure 4.16:	Profile 3 of OSBF showing the fourth mound along the foreshore and the eighth mound recorded in 2003 set further back.....	104
Figure 4.17:	Two dimensional GPR measurement showing two very clear, consistent, and almost uniform anomalies occurring under mounds two (right) and three (left).....	105
Figure 4.18:	First appearance of horizons at 52cm depth. Mound three is on the left and mound two on the right	105
Figure 4.19:	Two clear horizons are apparent at 60cm depth. Note the clarity of the matrix between the two horizons	105
Figure 4.20:	Horizons start to disappear at 72cm	105
Figure 4.21:	Most signs of horizons are gone at 90cm.....	105
Figure 4.22:	First squares with part of rock underfloor exposed and posthole	107
Figure 4.23:	Northern edge of foundation	107
Figure 4.24:	Northern edge of foundation (1), second (2) and first (3) major postholes with midway depression (4).....	107
Figure 4.25:	Concentration of even rocks in likely location of entryway	107
Figure 4.26:	Southwest corner of foundation	107
Figure 4.27:	Discard zone extending south from southern edge of foundation.....	107
Figure 4.28:	Large hand-cut calcarenite block situated next to entryway.....	107
Figure 4.29:	Three calcarenite blocks and hearth feature. Photo courtesy of Ian Hutton 2004.....	107
Figure 4.30:	North face section of squares F5 and F6 showing the general feature labeling for the OSBF excavation	
Figure 4.31:	West face section of trench extending across four squares, showing the extension of feature two beyond the foundation squares, the two sub-section layers of feature two (A and B) and the correlation of the mound on the surface with the occurrence of the foundation and subsequent drop off	108
Figure 4.32:	West face section of trench extending across two squares, showing a different edge configuration where a post hole occurs	109
Figure 4.33:	Complete extent of excavations on the Old Settlement Beach Foreshore.....	110
Figure 4.34:	Sharkey 1882 Palm thatch hut built in the ‘traditional’ LHI style in the 1860s	111
Figure 4.35:	LHI Smokehouse chimney containing calcarenite blocks, palm thatch and iron. ND. Courtesy of the Lord Howe Island Museum	111
Figure 4.36:	After Anon 1898 map. This map of LHI shows permissive occupancies and land use, including some crop types and well locations. Note the two gardens and swamp marked in North Bay	112
Figure 4.37:	After Foulis’ 1851 memory map of LHI in 1840s showing cleared land in North Bay	113
Figure 4.38:	Water filled depression	115
Figure 4.39:	Amber case gin bottle.....	115
Figure 4.40:	After 2001 oblique aerial photograph of North Bay, that clearly shows the ephemeral swamp, Nichols’ garden and the creek inlet that leads to the garden. Courtesy of the Land and Property Information Unit, Sydney, New South Wales.....	116
Figure 4.41	Profile of the round depression that occurs on the south west margin of the North Bay ephemeral swamp	118

Figure 4.42:	Original GPS survey of North Bay ephemeral swamp recorded November 2003	118
Figure 4.43:	Original GPS survey of the Nichols' garden recorded in November 2003.....	119
Figure 4.44:	North Bay Nichols' garden survey.....	121
Figure 4.45:	North Bay Nichols' garden profile showing relatively level ground surface and the 'channel' edges at 10 and 13 metres.....	123
Figure 4.46:	Square one end levels.....	123
Figure 4.47:	Square two end levels.....	123
Figure 4.48:	Bottle found in square three	123
Figure 4.49:	Square three end levels.....	123
Figure 4.50:	After Foulis' 1851 memory map showing cleared land and 'settlements in the Soldier's Creek basin at the southern end of LHI.....	125
Figure 4.51:	After Denham's 1853 map showing 'settlement' in the Soldier's Creek basin attributed to the Wright family.....	125
Figure 4.52:	After Anon 1898 map showing two structures and a well (all extant) on the King's lease (circled in black). The arrow indicates the approximate position of the 'Rose Garden' in relation. The red circle indicates the Johnson's house site (see Perry Johnson Land section).....	127
Figure 4.53:	2003 GPS survey of the 'Rose Garden'	127
Figure 4.54:	2004 survey of the land immediately surrounding the 'Rose Garden' ...	130
Figure 4.55:	Wright/King land profile 1	132
Figure 4.56:	Wright/King land profile 2.....	132
Figure 4.57:	Excavation square 1 end levels	132
Figure 4.58:	Excavation square 2 end levels	132
Figure 4.59:	Sharkey 1882. The Commissioners camp on the Johnson's land. Note the Johnson's thatch house in the background	134
Figure 4.60:	Sharkey 1882. The Johnson's original palm thatch house, with Mrs Johnson standing outside with a bullock.....	134
Figure 4.61:	2003 GPS survey of the Johnson's house site.....	135
Figure 4.62:	Survey of section two and three of Perry Johnson's Land.....	137
Figure 4.63:	Whole clear glass bottle recovered from the surface of one of the depressions recorded near the site of Ellen Fenton's former dwelling ...	138
Figure 4.64:	Cement tank stand with traces of cement lined iron tank that once sat on top of it.....	138
Figure 4.65:	Cement footing for large wood stove.....	138
Figure 4.66:	Iron tobacco tin filled and coated with cement to create a commonly used house pier on LHI (Fenton 2004)	138
Figure 4.67:	Metal fixtures associated with radio	138
Figure 4.68:	Surface scatter occurring along and directly above and below regular cattle track. The items found are most likely associated with the Fenton occupation	138
Figure 4.69:	Perry Johnson's land profile 1.....	140
Figure 4.70:	Perry Johnson's land profile 2.....	140
Figure 4.71:	Perry Johnson's land profile 3.....	141
Figure 4.72:	Perry Johnson's land profile 4.....	141
Figure 4.73:	After Anon 1898. (1) The only garden recorded north of the creek corresponds with the oleander recorded. (2) The larger stands of oleander south of the creek are most likely from this garden. (3) Approximate position of the modern ephemeral creek. (4) Approximate location and area of recent land slips	142

Figure 4.74:	Three dimensional diagram of the GPR survey showing a lineal anomaly occurring at a depth of approximately 45cm indicated by the arrows	144
Figure 4.75:	Square one end levels showing the sand conglomerate clearly across the whole square.....	145
Figure 4.76:	Square one west-north profile showing the clay rich fill at the top 10 to 12 cm of deposit.....	145
Figure 4.77:	Square two end levels showing the sand conglomerate just appearing through the yellow sand layer	148
Figure 4.78:	Calcarene rock fully exposed after three spits in the south corner of square B2 (3)	148
Figure 4.79:	Excavation grid laid out around excavation square 3 (B2) and the artefact rich shovel pit in C2	148
Figure 4.80:	Spit 1 excavated in A1 and A2 revealed clearly on calcarene rock in A2 and the very top of another in A1 indicated by the arrow.....	148
Figure 4.81:	Both A1 and A2 excavated to 15cm (spit 3 with spits four and five being excavated as 50x50 cm squares in the east and south corners respectively	148

Chapter Five

Figure 5.1:	Primary and secondary fabric categories	152
Figure 5.2:	Total fabric weights and counts at OSBF	155
Figure 5.3:	Total fabric weights and counts for each excavation square and shovel pit at OSBF	156
Figure 5.4:	Summary of assemblage distribution between discard zones and other squares by weight.....	157
Figure 5.5:	Summary of assemblage distribution between discard zones and other squares by count	
Figure 5.6:	Classification of excavation squares into activity zones	157
Figure 5.6:	Classification of excavation squares into activity zones.....	157
Figure 5.7:	Distribution of total assemblage across activity zones	158
Figure 5.8:	Distribution of glass assemblage across activity zones.....	158
Figure 5.9:	Distribution of metal assemblage across activity zones.....	158
Figure 5.10:	Distribution of ceramic assemblage across activity zones.....	158
Figure 5.11:	Distribution of organic assemblage across activity zones.....	158
Figure 5.12:	Distribution of other assemblage across activity zones	158
Figure 5.13:	Concentrations of other (ash and charcoal) across different activity Zones	159
Figure 5.14:	Artefact type, activity and use categories represented in the glass assemblage from OSBF	159
Figure 5.15:	Section of black bottle base that shows some evidence of being knapped, found H3	160
Figure 5.16:	Section of clear glass ground edge stopper that has been unifacially flaked, found J5	160
Figure 5.17:	Artefact type, activity and use categories represented in the metal assemblage from OSBF	160
Figure 5.18:	Artefact type, activity and use categories represented in the ceramic assemblage from OSBF	160
Figure 5.19:	Pattern side of Davenport blue and white transfer print earthenware plate	162

Figure 5.20:	Partial makers mark on reverse of plate showing printed and stamped word ‘Davenport’, stamped anchor and first letter of pattern.....	162
Figure 5.21:	Rim and lid portions of blue and white high-fired earthen ware vessel.....	162
Figure 5.22:	Side view shows flush fit of lid and vertical side of vessel	162
Figure 5.23:	Class, anatomical element and species/family identifications for the organic OSBF assemblage.....	162
Figure 5.24:	Averaged weights for different organic artefacts from OSBF showing varying degrees of fragmentation.	164
Figure 5.25:	NISP versus MNI representations of species abundance in OSBF.....	165
Figure 5.26:	NISP and MNI numbers of economic, possible economic and non economic species in OSBF.....	168
Figure 5.27:	Distribution of <i>Sus domesticus</i> skeletal elements across different meat bearing areas.....	170
Figure 5.28:	Proportion of <i>Sus domesticus</i> skeletal elements in different meat bearing areas.....	170
Figure 5.29:	Distribution of <i>Puffinidae</i> skeletal elements across different meat bearing areas.....	171
Figure 5.30:	Proportion of <i>Puffinidae</i> skeletal elements in different meat bearing Areas	172
Figure 5.31:	Distribution of non-species identified avian skeletal elements across different meat bearing areas	172
Figure 5.32:	Proportion of non-species identified avian skeletal elements in different meat bearing areas	173
Figure 5.33:	Date ranges of 22 artefacts from OSBF	174
Figure 5.34:	Frequency of decades across all dated objects from OSBF, showing the mode at 1820/1830.	175
Figure 5.35:	After White’s 1835 map showing Ashdown, Bishop and Chapman’s five huts recorded in December 1834. Arrow indicates approximate location of excavated hut foundation and adjacent horizon detected on GPR	179
Figure 5.36:	Total fabric weights and counts for each excavation square, shovel pit and surface scatter at PJJ	184
Figure 5.37:	Summary of total excavated artefact distribution by weight across excavation units (spits and profile collections).....	186
Figure 5.38:	Summary of total excavated artefact distribution by count across excavation units (spits and profile collections).....	186
Figure 5.39:	Distribution of total excavated assemblage by between B2 and all other excavation units (including shovel pits)	186
Figure 5.40:	Distribution of charcoal between B2 and all other excavated squares....	186
Figure 5.41:	Artefact type, activity and use categories represented in the glass assemblage from PJJ	188
Figure 5.42:	Three glass beads excavated from squares 1 and 2.....	188
Figure 5.43:	Two bone and one milk-glass buttons recovered from surface scatter 3, B2 and square 2 respectively.....	188
Figure 5.44:	Artefact type, activity and use categories represented in the metal assemblage from PJJ	189
Figure 5.45:	Artefact type, activity and use categories represented in the ceramic assemblage from PJJ	189
Figure 5.46:	Selection of blue and white transfer-ware from a teacup, and two Plates	190

Figure 5.47:	Large piece of willow pattern transfer-ware plate	190
Figure 5.48:	Medium piece of Asiatic pheasant transfer-ware plate	190
Figure 5.49:	Small piece of flow blue rim from a large ‘breakfast cup’	190
Figure 5.50:	Small piece of banded decoration from a mocha hollow vessel	190
Figure 5.51:	Small rim fragment of banded annular ware from a hollow vessel	190
Figure 5.52:	Two marked pipe stems, the top marked ‘Murray’ and the bottom marked ‘Davidson’	190
Figure 5.53:	Reverse of pipe stems showing ‘Glasgow’ on the Davidson pipe and the remains of a similar mark on the Murray pipe	190
Figure 5.54:	Class, anatomical element and species/family identifications for the PJJ organic assemblage	191
Figure 5.55:	Averaged weights for different organic artefacts from PJJ showing varying degrees of fragmentation	192
Figure 5.56:	NISP versus MNI representations of species abundance in PJJ	193
Figure 5.57:	NISP and MNI numbers of economic, possible economic and non economic species in PJJ	195
Figure 5.58:	Distribution of <i>Sus domesticus</i> skeletal elements across different meat bearing areas.....	196
Figure 5.59:	Distribution of <i>Puffinidae</i> skeletal elements across different meat bearing areas.....	197
Figure 5.60:	Proportion of <i>Puffinidae</i> skeletal elements in different meat bearing Areas	197
Figure 5.61:	Distribution of non-species identified avian skeletal elements across different meat bearing areas	198
Figure 5.62:	Proportion of non-species identified avian skeletal elements in different meat bearing areas	198
Figure 5.63:	Date ranges of 68 artefacts from OSBF	200
Figure 5.64:	Frequency of decades across all dated objects from PJJ, showing the mode at 1850	204
Figure 5.65:	Late 19 th century LHI house with support piers cut from local calcarenite. ND. Courtesy of the Lord Howe Island Museum.....	205
Figure 5.66:	Example of a 19 th century LHI smokehouse attached to a larger building. ND Courtesy of the Lord Howe Island Museum.....	205

Chapter Six

Figure 6.1:	After Hutton 1990. Seasonal availability of seabirds nesting on LHI pre 1788 up to the present	219
Figure 6.2:	Pre 1788 map showing the likely distribution of significant prey species of land and sea birds	220
Figure 6.3:	Table of settlers on LHI and likely population as at December 1834.....	221
Figure 6.4:	Map of settlement dwellings and gardens on LHI as at December 1834.....	222
Figure 6.5:	Table of settlers on LHI and likely population as at December 1841.....	223
Figure 6.6:	Map of settlement dwellings and gardens on LHI as at December 1841	224
Figure 6.7:	Table of settlers on LHI and likely population as at December 1844.....	225
Figure 6.8:	Map of settlement dwellings and gardens on LHI as at December 1844.....	226
Figure 6.9:	Table of settlers on LHI and likely population as at December 1847.....	227
Figure 6.10:	Map of settlement dwellings and gardens on LHI as at December 1847.....	228
Figure 6.11:	Table of settlers on LHI and likely population as at December 1848.....	229

Figure 6.12:	Map of settlement dwellings and gardens on LHI as at December 1848.....	230
Figure 6.13:	Table of settlers on LHI and likely population as at December 1853.....	234
Figure 6.14:	Map of settlement dwellings and gardens on LHI as at December 1853.....	235
Figure 6.15:	Table of settlers on LHI and likely population as at December 1858.....	237
Figure 6.16:	Map of settlement dwellings and gardens on LHI as at December 1858.....	238
Figure 6.17:	Table of settlers on LHI and likely population as at December 1868.....	244
Figure 6.18:	Table of settlers on LHI and likely population as at December 1868.....	245
Figure 6.19:	Table of settlers on LHI and likely population as at December 1878.....	248
Figure 6.20:	Inventory of the entire contents of the Lloyd's dwelling, which was exchanged with J.K. Jenkins, when the Lloyd's left the island in 1874 (Kelly 1984)	248
Figure 6.21:	Map of settlement dwellings and gardens on LHI as at December 1878.....	250
Figure 6.22:	Table of settlers on LHI and likely population as at December 1882.....	254
Figure 6.23:	Map of settlement dwellings and gardens on LHI as at December 1882.....	255
Figure 6.24:	Table of settlers on LHI and likely population as at December 1891.....	259
Figure 6.25:	Map of settlement dwellings and gardens on LHI as at December 1891.....	260
Figure 6.26:	List of crops grown and tried on LHI by 1898.....	262
Figure 6.27:	List of native plant species and their common uses on LHI in 1898	262
Figure 6.28:	Table of settlers on LHI and likely population as at December 1900.....	264
Figure 6.29:	Map of settlement dwellings and gardens on LHI as at December 1900.....	265
Figure 6.30:	Pre 1980 map showing the likely distribution of significant prey birds and recent colonisers/introductions.....	268
Figure 6.31:	Present day map showing the likely distribution of significant prey birds and recent colonisers/introductions	271

Chapter One

“...this quiet, isolated, but picturesque little spot”: Project Overview

Lord Howe Island (hereafter LHI) is a physically beautiful, historically interesting place, which for much of its history has been left largely to its own devices in the middle of the Tasman Sea. Most research attention has been given to the island’s natural attributes and their study, conservation and exploitation, while the historic and archaeological potential of the island has only been tentatively examined by a handful of serious researchers. The archaeological investigation of the LHI community could take many guises, since up to the present such investigations have been very limited in their scope. As such, any potential studies may choose from a broad range of untouched issues to investigate, some of which have equally broad implications for the community, Australian and Pacific archaeology, heritage and environmental management and planning. This particular project is interested in exploring the basic processes of environmental change and settlement development that came from the island’s discovery and occupation by Europeans in the mid 19th century, and how these may or may not have value in providing a comparative case for similar island occupations in both historic and prehistoric contexts. Further, it will seek to understand the role of isolation in this development and the influence of significant maritime industries in the Pacific in the 19th century. Potential implications of this project are numerous, but would primarily comprise insights into processes of primary human occupation on a naïve landscape, and a Pacific island in particular; insights into the settlement of contemporary historic islands and isolated communities; and given LHI’s relatively maintained ecological importance, inform on mechanisms of sustainable settlement in environmentally sensitive niches.

Although LHI’s environment has been the primary focus of previous studies and this project is one of few culturally oriented studies on the island, the island’s environment is of great significance to any study interested in its human settlement. This is due not only to the significant nature of Lord Howe’s environment, but also to the fact that the environment of *any* island of large distance from the nearest landmass will by default have a significant impact on the life-ways of any people living on its shores. As such a detailed description of the island’s natural attributes is provided in the following sections.

Study Area

The Lord Howe Island Group is situated in the northern Tasman Sea, 770km north-east of Sydney and 496km east of Port Macquarie, and consists of 27 offshore islets including Ball's Pyramid, the tall sea stack 23km south-east of the main island (see Figures 1.1 and 1.2; Hutton 1998). The LHI Group has a total area of 1540 hectares, with LHI accounting for 1455 hectares, making it the only island in the group large enough to sustain human settlement. This settlement currently covers about 398 hectares, which is cultivated, grazed and occupied by approximately 295 permanent residents, whose main industries are tourism, palm cultivation and island management (Australian Bureau of Statistics 2001; Hutton 1998).

The main island is approximately 11km long and 300m to 2km wide, forming a rough arc that curves to form a lagoon on the western side, which is fringed by the world's most southerly true coral reef. The reef is six kilometres long, with two main passages, (North and South) and encloses a lagoon with average water depths of about two metres. North passage is the main shipping inlet with depths between four and six metres, and the lagoon includes a couple of deeper water holes (Sylph's and Comet's) suitable for anchorage at similar depths (Hutton 1990; Nicholls 1952). The north end of the island features a significant ridge of hills that end in steep sea cliffs along the northern coast, and include Mt Eliza (147m) and North Peak (209m). The southern end is dominated by the precipitous Mounts Gower and Lidgbird, which rise 875m and 777m above sea level respectively, and including Intermediate Hill (250m) account for half of the island's total area. The mid section of the island forms a low isthmus between the northern hills and southern mountains, with a higher section of land edged by sea cliff on the east coast leading towards Transit Hill (121m). The sheer nature of the southern mountains and northern hills, the concentration of permanent groundwater on the relatively level lowlands and the need to maintain forest areas to provide wind breaks has restricted the area of land available for permanent settlement and has resulted in approximately 70% of the island remaining uncleared and relatively untouched (see Figure 1.3: Edgecombe 1987; Hutton 1998). To the immediate north-east of the main island, a small group of outlying basalt islets and rocks form the Admiralty Islands, and with scattered offshore islets and rocks around the southern coast and Ball's Pyramid and its associated rocks make up the remainder of the island group.

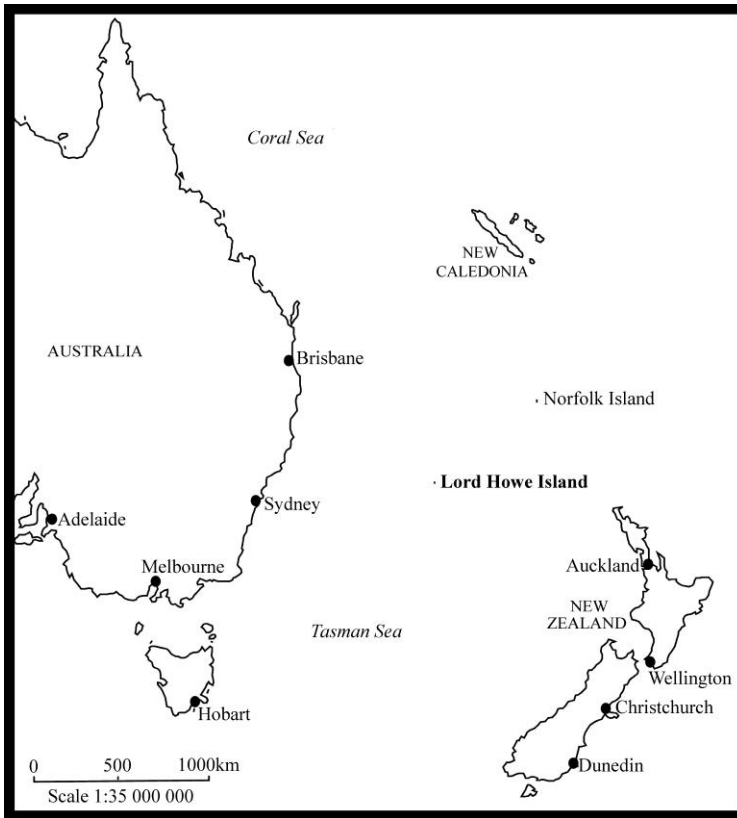


Figure 1.1: Lord Howe Island in relation to Australia and New Zealand

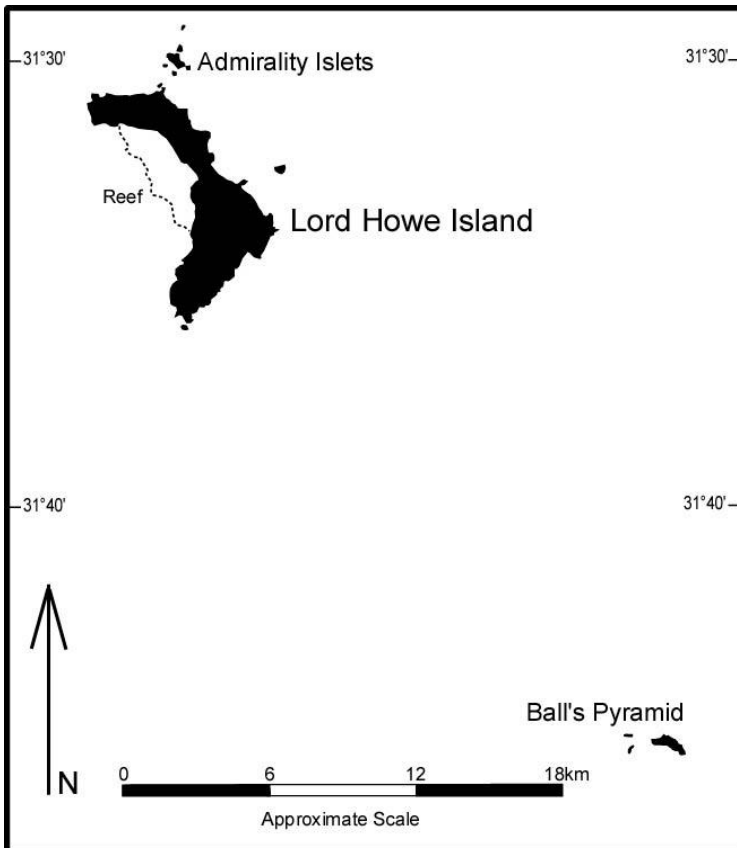


Figure 1.2: Lord Howe Island Group, including Ball's Pyramid

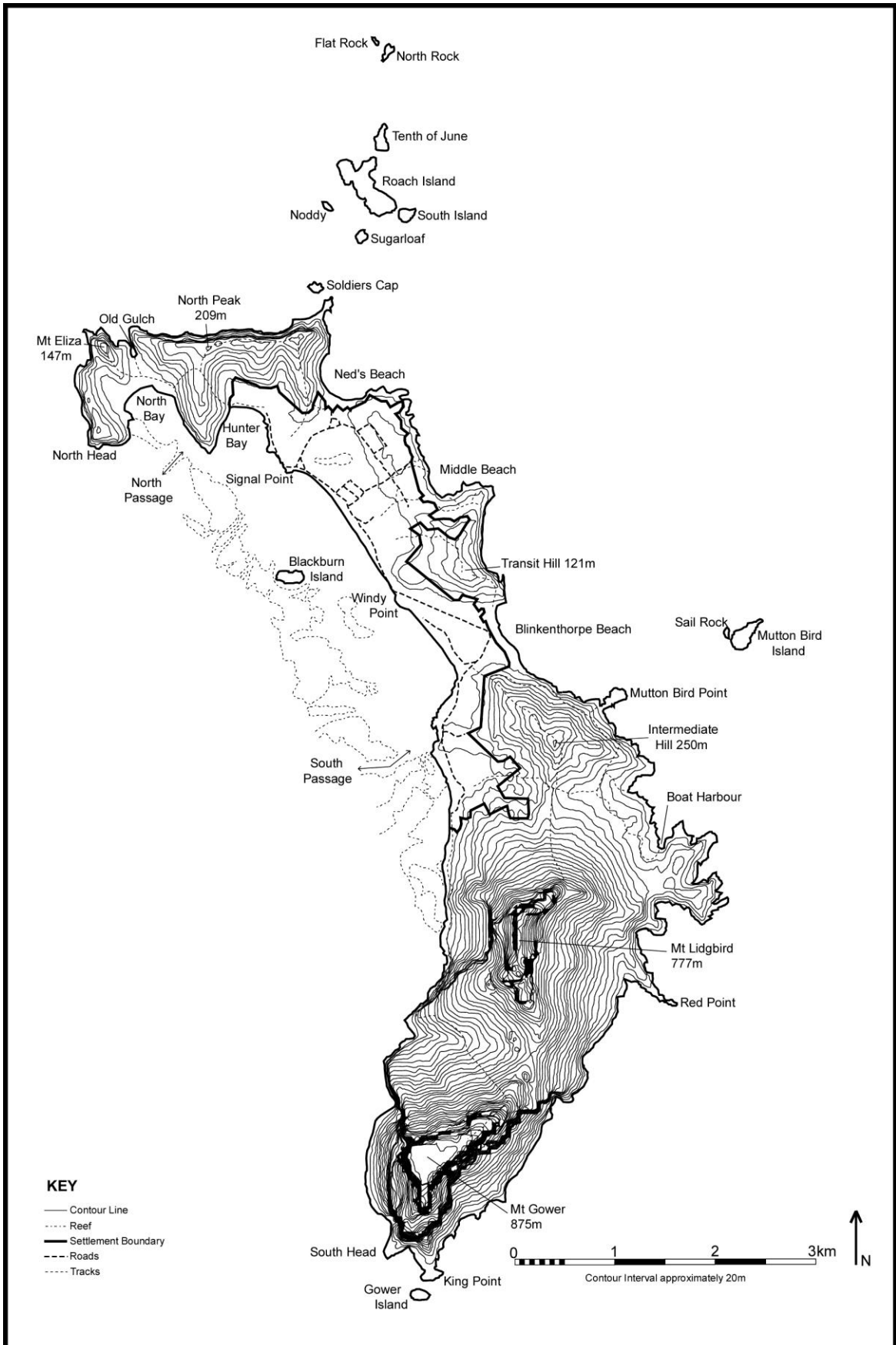


Figure 1.3: Lord Howe Island showing contours, settlement bounds and roads and tracks

Climate

Lord Howe Island has a mild climate yet paradoxically experiences frequent weather extremes. Predominantly east and north-east winds occur during summer, while winter winds are generally south-west, and wind speeds can exceed 30km (17 knots) per hour in summer and over 40km (22 knots) per hour in winter. Gale-force winds (over 34 knots) occur on average three days per month during winter, and the island also experiences occasional cyclonic activity from dissipating lows travelling south through the coral sea (Commonwealth of Australia 2002). Major storms are much more frequent, as the group is also subject to the high/low/trough systems that travel across southern Australia. Lord Howe Island enjoys mild temperatures and limited seasonal fluctuations, with summer temperatures ranging from 19° to 25° Celsius and winter temperatures from 13° to 18° Celsius. Humidity remains at a constant 70-77% and the yearly average of 1586mm rainfall occurs in moderate to heavy showers throughout the year, with a somewhat higher rainfall during the winter months (Australian Bureau of Meteorology 2006; Edgecombe 1987; Hutton 1998). Water surface temperatures vary from 17° to 25° Celsius, and are the product of LHI being on the boundary of two significant water masses, the tropical Coral Sea and temperate Tasman Sea. The LHI group also lies in the path of an east flowing eddy of the East Australian Current (EAC), which carries warm water and nutrients from the northern coral sea along the eastern edge of the Australian continent, dissipating into eddies flowing at its southern extent (Commonwealth Scientific and Industrial Research Organization 2000). This current maintains relatively warm waters around the LHI group for most of the year, which in turn influence the land temperatures, weather, and terrestrial and marine ecology of area.

Geology

The LHI group lies on the western edge of the Lord Howe Rise, an ocean floor ridge 2000km long and 300km wide extending from northern New Zealand to the Chesterfield Islands of New Caledonia (Edgecombe 1987; Hutton 1998). Lord Howe and Ball's Pyramid represent the exposed peaks of a large volcanic sea mount approximately 65km long, 24km wide and 1800m high below sea level, and are separated by a deep channel or valley below sea level. The combined LHI and Ball's Pyramid mounts are the youngest and southern most of a chain of nine seamounts extending along the rise, which formed as the Australian plate moved over a 'hotspot' in the earth's mantle (McDougall,

Embelton and Stone 1981; UNE-WCMC 1996). The seamount chain also includes Elizabeth and Middleton reefs, which lie 150km north of the LHI group and due to their greater age have eroded to below sea level forming reefs in otherwise deep ocean. The LHI and Ball's Pyramid guyots (volcanic islands) emerged between six and seven million years ago during a period of volcanic activity lasting approximately 500 000 years (McDougall, Embelton and Stone 1981). The main island and northern islets of the group are the eroded remains of one shield volcano that resulted, and represent about 3% of the original volume of the guyot which is estimated to have been 30km in diameter at sea level and approximately 1575m high (Hutton 1998). The southern mountains are the product of secondary erosion and collapse that occurred in the area of the Mt Lidgbird summit, creating a giant caldera (possibly 900m deep and five by two kilometres across) which was subsequently filled by lavas, creating the basalts of Mt Lidgbird and Mt Gower which are now erosion resistant volcanic plugs. Ball's Pyramid is the eroded remnant of a smaller shield volcano that formed at the same time as the LHI guyot, and was approximately six kilometres in diameter at sea level (Commonwealth of Australia 2002; Hutton 1998; McDougall et al 1981). Due to the group's geological origins, most of the islands are comprised of volcanic by-products such as basalt, tuff (volcanic ash) and breccia (ash and rock conglomerate) (Hutton 1998; McDougall et al 1981).

Calcareous rock and sand accumulations dating from the Pleistocene and through the Holocene also account for a significant portion of the main island's form, occurring mainly on the lowlands of the island and contain fossil remains of turtles, birds, eggs and marine and land snails (UNEP-WCMC 1996). More significant fossil remains include those of a giant horned land turtle *Meiolania platyceps*, which have been recovered in calcareous deposits around the island dating between 100 000 and 20 000 years old. *Meiolania platyceps* has an unusual distribution, as its remains have also been recovered near New Caledonia, Australia and Argentina and it is possibly a remnant Gondwana species that went extinct around 20 000 years ago (Hutton 1990; Hutton 1998). Remains of a small penguin, similar to the Little Penguin (*Eudyptula minor*) have also been recovered, and it is possible that it was a species that bred on LHI during the last glacial maximum, contemporary with *Meiolania* (Hutton 1990). Other fossil discoveries have identified species endemic to LHI or the LHI/Norfolk island region. The discovery of a fossil bat skull in 1972 led to the description of a new species *Nyctophilus howensis*, which was an endemic species that may have survived into historic times, as indicated by some historic

sources (Finch and Finch 1967; Hill 1869, Reid 1920). Fossil remains of Booby (*Sula*) on LHI and Norfolk Island, that are larger and have different osteological morphologies to the Masked Booby (*Sula dactylatra*), coupled with accounts of large numbers of ‘gannets’ nesting on LHI in 1788 outside their usual season have led to the description of an extinct species, the Tasman Booby (*Sula tasmani*) (Hutton 1990; van Tets, Meredith, Fullager and Davidson 1988). Subsequent authors have rejected this identification of a new species of Booby, citing that the larger size is within the upper limits of *Sula dactylatra* size range and seasonal and nesting location anomalies revealed by the early accounts were not significant enough to demonstrate a separate species (Holdaway and Anderson 2001). The most recent review of endangered and extinct species by the IUCN Red List of Threatened species has included *Sula tasmani* as a separate extinct species, but the debate continues and for this project it is acknowledged as a recognised but debated species (IUCN 2006c).

Flora and Fauna

By virtue of islands’ climate, water temperature and geographical location the LHI group is a crossroads for tropical, subtropical and temperate species of both land and sea, and owing to its particular isolation and geological age it is also home to a significant number of species endemic to the LHI group, LHI and Norfolk Island or LHI/Norfolk Island/Middleton-Elizabeth Reef biogeographical region (Commonwealth of Australia 2002). Flora and terrestrial fauna, with a few exceptions, are most closely related to Australian, New Zealand, Norfolk Island and New Caledonia species, as well as some Pacific Islands. The LHI group has 243 native species of plants, 105 of which are endemic but overall share 129 genera with Australia, 102 with New Caledonia and 75 with New Zealand (Hutton 2002; UNEP-WCMC 1996). Approximately 160 exotic species have been introduced and naturalised since 1834, the majority occurring in the lowland settlement areas with little encroachment into preserved forested areas. Three species threaten to be more serious weeds, but active management programs of these and other introduced species maintain the integrity of most native forest (NSW National Parks and Wildlife Service 1989; UNEP-WCMC 1996). Pickard (1983) identified 25 vegetation associations in 20 alliances, 14 of which are dominated by endemic species. In more general terms, prior to human settlement the majority of LHI was vegetated with temperate rainforest and palm forest, with shrub and herb communities on exposed sites and cliffs, and grass and shrubs on some lowland dune areas (Recher and Clark 1974; UNEP-WCMC 1996). The majority

of this vegetation regime remains with a mosaic of lowland forest clearance or coppicing, which has created grasslands for grazing and reduced swamp areas due to drainage and loss of forest cover.

Native terrestrial fauna is varied but restricted to mostly invertebrates, with only birds, two reptiles and possibly three bats comprising the native vertebrate population. Other species have been introduced to the island from 1788 onwards and include pig (*Sus scrofa*), goat (*Capra hircus*), dog (*Canis lupis familiaris*), chicken (*Gallus gallus*), cat (*Felis catus*), mouse (*Mus musculus*), horse (*Equus caballus*), cow (*Bos taurus*), and rat (*Rattus rattus*) and several of these species either no longer occur on LHI or are being eradicated in line with conservation and management plans. To date studies of island invertebrates are limited and continued research identifies new species, particularly on the summits of Mts Gower and Lidgbird. Of those studied, many LHI invertebrates have high rates on endemism: for example out of 100 species of spider, at least 50 are endemic; there are at least five species of endemic fly, and nine that are endemic to LHI and Norfolk; one species of leech, 10 species of earthworm and 12 species of isopods are endemic to the island group (UNEP-WCMC 1996). Nine species and 16 subspecies of terrestrial mollusc from Australia and New Zealand inhabit streams, waterfalls and ground litter, while 24 species of Pacific butterflies occur, but at least 1/3 do not breed on the island due to lack of suitable caterpillar food (Hutton 1998; UNEP-WCMC 1996). Fresh water crustaceans are not well studied, but at least two species are known, one crab (*Halicarcinus lacustris*) and one shrimp (*Paratya xiphatyoida howensis*). Eels are historically known in island creeks, and are likely to be the Short Finned Eel (*Anguilla australis*) (Anon 1880; Hill 1870; NSW National Parks and Wildlife Service 1989; Reid 1920). One of the LHI groups' more famous species is the LHI Phasmid or 'land lobster' (*Dryococelus australis*), a large flightless stick insect which became extinct on the main island sometime after 1918. The species was thought to be completely extinct until a small colony was discovered on Ball's Pyramid in 2001, and a captive breeding program is being established with a view towards re-releasing the Phasmid on LHI in the future.

Vertebrates apart from birds are limited; two terrestrial reptiles, a skink (*Leiopisma lechenigera*) and a gecko (*Phyllodactylus guentheri*) are found on LHI in limited numbers, but are much more numerous on the offshore rocks and islets. Three species of bat are mentioned in different sources, but it is not clear whether *Vespadelus pumilus* and *Scotophilus morio* are on island breeders or periodic visitors, and *Eptesicus*

sagittula is recorded in one source as occurring in island limestone caves, but is not mentioned elsewhere (Recher and Clark 1974; UNEP-WCMC 1996). Other land fauna consist entirely of birds; approximately 166 species of terrestrial and sea birds have been recorded on the LHI group, but the majority are occasional or rare visitors, with 18 land and 14 sea species regularly occupying and/or nesting on the island group (see Figure 1.4: Hutton 1990; 1998). The species of terrestrial birds on the island today are quite different to that at discovery and reflect changes wrought from extinctions and new waves of colonisation from opportunistic species, as well as naturalised human introductions. At discovery there were 15 land bird species, four of which were endemic species and eight endemic subspecies. Following human settlement and introduction of rats, nine species became extinct, and due to the ecological void that resulted and the creation of new habitats from land clearance, 10 new species permanently colonised the island, some as recently as the 1990s (Hutton 1990). Two species were introduced to LHI, the Masked Owl (*Tyto novaehollandiae*) and the Australian Magpie Lark (*Grallina cyanoleuca*), both in an effort to alleviate the impact of rats on the island (Hutton 1990).

Breeding seabirds on LHI have remained much more consistent, as only one extinction, the Tasman Booby (*Sula tasmani*) has occurred since 1788. Seabirds have not been entirely unaffected, as some colonies have dwindled in size and range on the main island, while other species that used to breed on the main island now only occur on the offshore rocks and islets (Hutton 1990). In recent years following pig, goat, and cat eradication and more effective rat control, some species are starting to re-colonise old breeding locations on LHI, and are increasing in number (Hutton 1990; Recher and Clark 1974). Many LHI seabird colonies are significant in the region or the world: The islands' Flesh-footed Shearwater (*Puffinus carneipes*) colonies contain possibly half of the world's population; it has the greatest concentration of Red-tailed Tropicbirds (*Phaethon rubricauda*) in the world; the group is the only Australian breeding location for the Kermadec Petrel (*Pterodroma neglecta*) and the Grey Ternlet (*Phocelsterna cerulea*); it is the most southerly breeding location for the Masked Booby (*Sula dactylatra*) and Sooty Tern (*Sterna fuscata*); and it was the only known breeding location for the Providence Petrel (*Pterodroma solandri*) in the world until the discovery of a small colony on Phillip island, south of Norfolk island in 1985 (Hutton 1990; Recher and Clark 1974; UNEP-WCMC 1996).

Common Name	Scientific Name	End Sp	End Sub-sp	Extinct	Rec Col	H Intro
Breeding Land Birds						
White Gallinule	<i>Notornis alba</i>	LHI		1788-1840s		
White-throated Pigeon	<i>Columba vitiensis godmanae</i>		LHI	c 1853		
Red-fronted Parakeet	<i>Cyanoramphus novaezealandiae subflavescens</i>		LHI	c1869		
Lord Howe Boobook	<i>Ninox novaeseelandiae albaria</i>		LHI	1950s		
Vinous-tinted Blackbird	<i>Turdus xanthropus vinitinctus</i>		LHI	c1920		
Lord Howe Fantail	<i>Rhipidura cervina</i>	LHI		c1924		
Lord Howe Gerygone	<i>Gerygone insularis</i>	LHI		c1929		
Lord Howe Starling	<i>Aplonis fuscus hullianus</i>		LHI	c1920		
Robust White-eye	<i>Zosterops strenua</i>	LHI		c1924		
Lord Howe White-eye	<i>Zosterops tephroleura</i>	LHI				
Lord Howe Currawong	<i>Strepera graculina crissalis</i>		LHI			
Lord Howe Golden Whistler	<i>Pachycephala pectoralis contempta</i>		LHI			
Woodhen	<i>Tricholimnas sylvestris</i>	LHI				
Emerald Ground Dove	<i>Chalcophaps indica</i>					
Sacred Kingfisher	<i>Todiramphus sanctus</i>					
White-faced Heron	<i>Ardea novaehollandiae</i>				c 1938	
Australian Kestrel	<i>Falco cenchroides</i>				1940s	
Pacific Black Duck/Mallard	<i>Anas superciliosa x Anas platyrhynchos</i>				1970s	
Buff-banded Rail	<i>Gallirallus philippensis</i>				1890s-1940s	
Purple Swamphen	<i>Porphyrio porphyrio</i>				1980s	
Masked Lapwing	<i>Vanellus miles</i>				1990	
Welcome Swallow	<i>Hirundo neoxena</i>				1970s	
Blackbird	<i>Turdus merula</i>				1950s	
Song Thrush	<i>Turdus philomelos</i>				1950s	
Common Starling	<i>Sturnus vulgaris</i>				1920s	
Masked Owl	<i>Tyto novaehollandiae</i>					1920s
Australian Magpie Lark	<i>Grallina cyanoleuca</i>					1920s
Breeding Sea Birds						
Tasman Booby	<i>Sula tasmani</i>	LHI, NFI		post 1788		
Masked Booby	<i>Sula dactylatra</i>					
Black-winged Petrel	<i>Pterodroma nigripennis</i>				1940s-1960s	
Flesh-footed Shearwater	<i>Puffinus carneipes</i>					
Wedge-tailed Shearwater	<i>Puffinus pacificus</i>					
Littler Shearwater	<i>Puffinus assimilis</i>					
White-bellied Storm Petrel	<i>Fregatta grallaria</i>					
Providence Petrel	<i>Pterodroma solandri</i>	LHI, NFI				
Kermadec Petrel	<i>Pterodroma neglecta</i>					
Red-tailed Tropicbird	<i>Phaethon rubricauda</i>					
Sooty Tern	<i>Sterna fuscata</i>					
Common Noddy	<i>Anous stodlii</i>					
Black Noddy	<i>Anous minutus</i>					
White Tern	<i>Gygis alba royana</i>		LHI, NFI, KMI		1940s-1960s	
Grey Ternlet	<i>Procelsterna cerulea</i>					

Figure 1.4: Present day and extinct breeding land and sea birds of the LHI group

Note: End Sp = Endemic Species End Sub-Sp = Endemic Sub Species Rec Col = Recent Colonist H Intro = Human Introduction NFI = Norfolk Island KMI = Kermadec Islands

Due to LHI's situation between the Coral and Tasman Seas, and the influence of the EAC eddies, the island's surrounding waters are host to a unique mix of tropical, sub-tropical and temperate reef and pelagic species of marine fauna and flora. Many species are at their most southerly distributional limits, and the combination of shallow inshore reef and several gradients of deep water provided by the LHI seamount make the local marine habitats particularly unusual and productive. The peak depths at the base of the LHI seamount are such that thorough species surveys are difficult, and the majority of identified species are from shallow, inshore habitats. Currently 447 species of fish are known from the LHI group, 15 of which are endemic to the LHI/Norfolk Island region, and 40 being endemic to the Tasman Sea. Annual water temperature fluctuations influence faunal communities during the year, and many larger marine animals are migratory and only seen during certain seasons (Commonwealth of Australia 2002). Three species of marine turtle are known; the Green Turtle (*Chelonia mydas*), the Hawksbill Turtle (*Eretmochelys imbricata*) and the Loggerhead Turtle (*Caretta caretta*) which are mostly present during the summer months, but no species nest on the island (Coleman 2002; Recher and Clark 1974). Most cetaceans are uncommon and largely seasonal, with Sperm and Humpback Whales (*Physeter macrocephalus* and *Megaptera novaeangliae*), and the Common (*Delphinus delphis*), Spinner (*Stenella longirostris*), Dusky (*Lagenorhynchus obscurus*) and Pan Tropical Spotted (*Stenella attenuata*) dolphins migrating through LHI waters at various times of year. Bottlenose Dolphins (*Tursiops truncatus*) are more common throughout the year, and regularly swim with vessels travelling between LHI and Ball's Pyramid (Coleman 2002; Commonwealth of Australia 2002).

At least 83 species of coral and more than 65 species of echinoderm (sea urchins) have been identified, most of which are widespread species on the Great Barrier Reef (GBR) but significantly co-exist with sub-tropical species that are rare or non-existent on the GBR (Commonwealth of Australia 2002; UNEP-WCMC 1996). Echinoderms include 45 tropical, 16 temperate and four endemic species, while coral communities are dominated by a few common species interspersed with rarer examples of the remaining species which may be the result of chance recruitment from stray larvae, but cannot self regenerate at LHI. It appears that the dispersal of coral larvae from outside communities is a sporadic event, and thus the LHI corals are slow to regenerate due to this, cooler water, higher nutrient levels and possible competition from algae (Commonwealth of Australia 2002). Algae are particularly successful and many tropical and sub-tropical species grow more

luxuriantly in LHI waters than elsewhere, particularly the GBR, and are a possible competitor for corals for space and sunlight. At least 305 species of algae are known, 47 of which are endemic, but these only account for shallow reef habitats, as there is almost no data on deeper water species (Commonwealth of Australia 2002).

Historical Overview

Lord Howe Island was discovered, claimed and perfunctorily explored during the HMS *Supply*'s first voyage to Norfolk Island from Port Jackson from February-June 1788. Despite initial excitement relating to the islands apparently abundant turtle supply and wealth of tame, palatable birds, the island was quickly dismissed as being of use to the colony. Although part of the colony of New South Wales from the beginning, the island remained uninhabited and only periodically visited by whaling and trade vessels for water, game and firewood for the next 46 years. Following the islands informal use by passing vessels, seven adults and two children were landed on LHI in 1834 with the express purpose of establishing a trade depot to provide more substantial supplies to whaling and trade vessels. This small group quickly established a small settlement, including gardens and hunted native and feral game for supply to passing vessels.

This set the stage for LHI's future development, which initially was dependant on trade from whaling vessels hunting the 'middle grounds' between Sydney and the New Zealand coast. Lord Howe is almost in the middle of these grounds and during the peak year 1865 approximately 70 ships visited LHI, with up to 12 vessels in harbour at one time. During the 1870s the whaling industry declined sharply with the wider introduction of petroleum products and the LHI community became increasingly isolated from the world and had to be completely self sufficient, with three years passing at one stage without a ship calling. With the eventual return of trade, islanders were still in a financially precarious position and the need for a new industry was quickly led to the export of palm seed from the one of the island's unique species, *Howea fosteriana*. The seed industry formed the basis of the island's economy from 1878 onwards and subsequently LHI developed other ventures including the export of fruit, vegetable and flower seeds, whole frozen fish and the growth of tourism. Today tourism, meteorological work, environmental management and *Kentia* palm cultivation provide employment for the majority of islanders.

Management and Heritage Listings

The LHI Group is classed as a part of New South Wales, although it lies outside the normal bounds of state territorial waters, and residents participate in state and federal elections as members of the Sydney state electorate of King and Federal electorate of East Sydney. Local government is in the form of the Lord Howe Island Board, which consists of three elected island residents and two off-island government employees, which convenes regularly to administer issues usual to most municipal councils. The LHI Board constitutes the main authority that has a permanent presence on the island; however there are several listings and parks that have been declared on the island that come under differing state and federal authorities. The LHI Board administers civic issues while co-managing conservation efforts with staff from relevant authorities, and major focus is placed on sustainable waste management, land development, and tourist numbers and as well as management and/or eradication programs for introduced animals and plants and management and monitoring of threatened species. Most listings relate to LHI's outstanding natural features including geological, floral and faunal communities of unique and representative significance, and thus a large proportion of management efforts are directed towards the conservation of LHI's terrestrial and marine environment. Two parks exist on LHI or around and in its immediate environs: the LHI Permanent Park Preserve, and the LHI Marine Park which has both state and commonwealth components. The Permanent Park Preserve was declared in 1981 and is administered by the LHI Board under similar management guidelines as used for national parks, and its boundaries follow that illustrated by the heavy black line in Figure 1.3, and accounts for approximately 70% of the LHI group's land area. The Marine Park has two boundaries; the state park covers from the LHI shore to three nautical miles out and was declared in 1999, and the commonwealth park continues on to 12 nautical miles out and was declared in 2000. Both parks have different conservation zones and management plans which are administered by the Marine Parks Authority (State) and the Department of Environment (Commonwealth).

In addition, the LHI Group was inscribed on the World Heritage List in 1982 for its outstanding natural universal values; specifically its significant marine and terrestrial flora and fauna, including its high rates of endemism and mixed communities of tropical, sub tropical and temperate species, as well as the group being an outstanding example of the evolution of guyot formation on oceanic ridges and subsequent geological processes of erosion, sedimentation and eventual floral and faunal colonisations (Commonwealth of

Australia 2002; UNEP-WCMC 1996). The LHI Group is NSW's first World Heritage Listed area, and Australia's fourth, and this international recognition of the island's outstanding natural values is echoed in other heritage listings. Entered in 1999, the LHI group is listed in its entirety on the NSW State Heritage Register due to its natural values, World Heritage Listing and significant cultural heritage associations in NSW history. The Register of the National Estate listed the LHI Group in 1978 for its natural values, but while the listing acknowledges the possible existence of cultural values of significance, none have been by the Australian Heritage Council to date. Similarly, the National Trust register focuses on the natural aspect of LHI's significance and listed the LHI Group on the basis of natural, scientific and aesthetic values in 1974. However, cultural values are acknowledged with seven individual locations being identified as having local cultural significance, which mainly comprise cemetery and memorial sites.

Previous Studies

Previous studies on LHI's human history mainly comprise general island histories (which mostly source the same primary sources and each other) in addition to a handful of thematic works (for example Cumming 1998; Edgecombe 1987; Hayward 2002; Hutton 1998; Finch and Finch 1967; Lord Howe Island Central School 1979; Phillips 2002; Mayo and Mendelsohn 1998; McFadyen 1992; Nicholls 1952; Nichols 2006; Rabone 1940). Those studies that extend beyond such generalised analyses are very few and comprise a preliminary architectural and archaeological study in 1984 (Birmingham, Kelly and Tanner 1984) and a maritime archaeological survey in 2002 (Smith and Nutley), both of which were directed towards identifying heritage resources for the purposes of initial management decisions. Research oriented investigation of LHI's human past to date has been restricted to limited coring activities looking for evidence of vegetation change and pre-European occupation of LHI.

Throughout the history of European contact and occupation of LHI, evidence of previous human occupation has never surfaced. This lack of evidence suggested either prior human occupation whose extent and duration were so limited as to have been completely obliterated by the passage of time, or the complete absence of human occupation prior to 1834. This historic lack of evidence was not deemed conclusive, as similar scenarios on a number of other remote, Pacific islands have later revealed evidence of occupation and subsequent abandonment (Anderson 2003; Anderson and White 2001).

Coring for pollen evidence of vegetation histories of LHI in 1982 were later followed in 1996 by investigations testing the apparent lack of pre-European habitation of LHI, conducted by a team from the University of Wollongong, and Mike McPhail and Atholl Anderson from ANU (Anderson 2003; Dodson 1982; Kennedy and Woodroffe 2000; MacPhail 1996). Coring of several sedimentary sites revealed preliminary charcoal and pollen evidence of vegetation clearance that were concurrent with modern European occupation which, coupled with evidence regarding the late introduction of murids and subsequent faunal extinctions, gave considerable weight to the notion of LHI having no prehistoric occupation (Anderson 2003; MacPhail 1996). This led to new questions relating to LHI that have implications not only for the history of LHI but the nature of island colonisation by European communities and the impact on a Pacific environment. Anderson (2003: 7) elaborates:

“[LHI]...is an uncommonly visible landscape of initial human colonization. It is important in its own right as a clear and contained example of the archaeology of European colonization, but also holds out the prospect of a valuable analogue of Pacific prehistory. The basic questions that are usually asked of prehistoric colonization; about the location of the first settlement, the nature of their subsistence patterns, the rate and directions of human impact on the environment, and the early direction of economic and demographic change, may be more amenable to archaeological investigation on Lord Howe than on any other remote Pacific island and provide, thereby a valuable comparative case.”

Concurrent with the idea of the LHI colonisation being an informative analogue for prehistoric examples, is that of it also being a rare example of a *modern European* island colonisation and the opportunity it presents to examine how technology, cultural background and historic context do or do not influence the processes of humans moving into a naïve environment. Beyond the questions arising from LHI's colonisation are numerous themes that could be investigated relating to LHI's past, such as locally relevant issues relating to the development of the settlement, processes of change and heritage values and management, to broader archaeological concerns relating to Australian, Pacific and colonial archaeology in general. These are too numerous to examine fully, but those that directly relate to the research interests of this project and LHI's particular historic context include island colonisation and the evolution of settlement landscapes, the development of communities in isolation, and the nature and influence of networks of maritime interaction. Each of these issues in turn include more specific themes such as environmental impact and

change, processes of social, technological and subsistence adaptation and the influence of particular maritime industries in the Pacific, specifically the whaling (and to some extent), sealing industries.

Research Questions and Aims

This research seeks to investigate two main themes as they manifest on LHI: island colonisation and the development of settlement landscapes, with more particular reference to the influence of isolation and 19th century maritime networks (particularly whaling) as outlined above. These themes are more appropriately applied to the earlier phases of settlement on the island, and in keeping with the research focus on the influence of isolation on settlement development it is proposed to examine LHI's past from 1834 to the end of its more marked isolation with the advent of regular cargo and passenger services to the island in 1893. As such it is intended to survey human occupation features that date from times between 1834 and 1903, to allow a glimpse into the transitions that would have occurred during the first ten years of regular contact, and excavate sites that span across sections of this time period, with overlap between site occupation times. The environmentally focused aspects of the project cannot be so neatly contained, as the ecological consequences of the human colonisation of LHI are evolving processes which are not as quickly influenced by finite historic events as some social and cultural events are. As such there is material that relates to events that occur beyond the threshold of 1903, as they have a particular influence on the environmental outcomes of LHI's human occupation. As such, while the central research proposition has a stated time period of study interest, this relates only to the dates of occupation sites investigated, and the visual landscape reconstructions developed as part of the overall approach to investigating LHI. This fluidity of dates is indicative of difficulty in separating the complex processes of human agency that operate in the world, and the LHI landscape in this example (for more discussion, see chapter two). Thus, the main research proposition is as follows:

Question: What processes of change occurred during the colonisation of Lord Howe Island and how have those processes, the island's isolation and 19th century maritime trade shaped the nature of the settlement landscapes that are present throughout the evolution of the Lord Howe settlement from 1834 to 1903?

This question shall be addressed by fulfilling several research aims:

Aims:

1. To identify the processes of environmental change and stability that have resulted from the colonisation of Lord Howe Island, by exploring:
 - The nature of native resource exploitation and conservation
 - The impact of introduced fauna and flora
 - The changing economic conditions that drove settlement expansion and contraction
 - The influence of historic context has on the eventual conservation outcomes for LHI environment

2. To explore the nature of the settlement's isolation and the development of LHI community life-ways, by identifying:
 - Survival strategies relating to subsistence, farming practice, other local customs, innovations, and environmental knowledge and maintenance.
 - Social situations and community networks

Methodology

This research has been undertaken using a variety of methods, which include standard archaeological practices. Particular methodological approaches developed for this project are designed to cover all types of material available on LHI and to best analyse this information to reconstruct the development of the island settlement. Fieldwork was undertaken during two trips to LHI, the first being a reconnaissance trip of one week to confirm the likely existence and location of archaeological remains, undertake preliminary surface recording of potential sites and to consult with leaseholders, local government and the community. Following successful applications for several permissions, the second trip to LHI was 12 weeks duration and included the full surface recording of six sites, the excavation of four, the collection of oral histories and the presentation of four public information sessions. These activities were undertaken with the aid of four trained and one community volunteer and one GPR technician. The majority of artefact analysis was

undertaken by the author at the Australian National University, with some expert advice sought with regard to particular artefacts (see chapter five).

Historic Research

Primary and secondary resource materials were collected and analysed from a number of sources including local, university, state, national, museum, corporate and government agency libraries; state archives; and online databases and resources. These resources have included historic and modern published books and diaries; journal, magazine and newspaper articles; parliamentary reports and proceedings; original diary, field notes and ships log manuscripts; drawings, photographs, maps and plans. This data was used to synthesise a background history; pinpoint locations of cultural features; establish sequences of events; identify the nature of and changes to the environment, structures and settlement layout; provide insight into islander and visitor experiences; illuminate details of social conditions; and uncover any informal, unknown or hidden practices and activities.

Community Consultation

Initial community contact was made through the Island governing body, the LHI Board, followed by direct consultation with community members through informal discussions and semi structured interviews. These were undertaken with a view to collecting oral histories relating to site locations and histories, artefact finds, general island history and personal knowledge and experience of island life.

Pedestrian survey

General observations of LHI's settled area were undertaken to confirm the location of previously known sites of interest and to identify any previously unknown locales of research potential. Following consultation with the appropriate leaseholders, more detailed pedestrian surveys were undertaken on particular sites to ascertain the existence of any archaeological feature and the possible extent of associated land use at each locale.

Surface Survey

Surface recording of the exact locations of sites was achieved using a theodolite and GPS, with features such as remnant vegetation, clearance lines, water features, ditches, tracks and roads, fences, structures, surface scatters and conspicuous mounds, depressions and level areas being recorded. Site profiles were also undertaken to assess land slopes and confirm (or deny) the presence of anomalous land features.

Ground Penetrating Radar (GPR)

Pinpointed GPR surveys, using a GSSI TerraSIR System-3000 with a 900MHz antenna, were undertaken on suitable sites to locate expected subsurface features that are ordinarily hard to trace such as eroded or buried middens and latrines, and further define the occurrence of subsurface remains and appropriateness of excavation locations. Radar results were confirmed further with limited shovel tests to ensure the appropriateness of excavation locations.

Excavation

Following the result of surface survey and GPR, four sites with potential were investigated using a standard test pitting regime based on one by one metre test pits whose location was dependant on the nature of the site and evidence of archaeological remains. These pits were excavated in arbitrary five centimetre spits, dependant on the presence or absence of natural excavation features and the amount of squares and whether they were stand alone pits or placed concurrently to form trenches or open areas was dictated by the archaeological remains present in the test pit and site specific questions that needed to be addressed (for more detail see chapter four). Spoil from all excavations was sieved through two and five millimetre nested sieves, all finds collected, and soil samples collected from each feature for pH testing.

Site Photography and Sketching

At each of the sites surveyed numerous digital colour photographs were taken to record whole sites, the immediate surrounds, features identified within each site, stages of excavation and finds. Rough field sketches of sites, excavation levels and sections were also drawn for reference in addition to the formal site photographs and plans completed from survey results.

Artefact Analysis

All recovered artefacts were dry cleaned, counted, weighed and sorted into primary and secondary artefact fabric categories common to many historical archaeology studies, as described in the Port Arthur archaeological procedures manual (Davies and Buckley 1987). A more detailed scheme of functional classification was developed with reference to several relevant studies (for more detail see chapter five) while faunal remains were anatomically identified and assigned to species or class as much as possible.

Development of Settlement Maps

Using data derived from the historic and archaeological record, a series of colour coded maps illustrating the settlement development over time were drawn. These, in conjunction with a synthesis of settler movements, activities and resource use illustrate the expansion and contraction of settlement and changes and stability of resource, land use and where possible environmental impact.

General Progression of Thesis

In order to explore the issues briefly discussed above and present some resolution of the research question and aims, this thesis is structured as follows. Building upon the study background presented in this chapter, chapter two reviews the larger archaeological and historic background to the thesis and draws links between them as they relate to LHI. Chapter three presents an in-depth historical reconstruction which provides additional links to those discussed in chapter two while laying the background evidence for the remaining chapters. Chapter four describes the archaeological investigations undertaken, while chapter five follows with an analysis of the artefacts recovered and discussion of how they relate to the research question. Chapter six combines the evidence gleaned from the historic record with that recovered from the archaeological investigations, and textually and visually presents and discusses this data. Finally, chapter seven draws together the issues and discussions presented in the preceding chapters, reviews them in reference to the research question and concludes the thesis outcomes.

Chapter Two

Physical, Historical and Cultural Islands: Research Background

As discussed previously (see chapter one) the scope of prior study on LHI's human history is limited to a small selection of generalised histories, two preliminary archaeological surveys and sedimentary coring investigations in 1982 and 1996 (Anderson 2003; Dodson 1982; Kennedy and Woodroffe 2000; MacPhail 1996). From an archaeological point of view, the human occupation of LHI has largely been left unstudied, and this research constitutes the first archaeological excavation program undertaken on the island. Similarly, although research themes relating to LHI and its colonisation have been identified previously, this thesis is the first instance of a significant research oriented project being undertaken to address those and other themes relating to the human past of the island.

The archaeology of LHI settlement could be investigated in reference to numerous areas of biological, anthropological, sociological and historical interest, so for the purposes of this project, a handful of specific research concerns have been identified as being of particular relevance to the research question and aims outlined in chapter one. The overarching framework within which this investigation of LHIs colonisation and settlement is situated is that of 'landscape' (or previously known as 'cultural landscape') and a discussion of what this entails is necessary to illustrate the approach of the whole project. More specifically there are several areas which must be addressed to illustrate the particular theoretical and historical context of LHI and this particular project. A general overview of the nature of island-human interactions, with particular reference to island ecology and generally recognised patterns of human colonisation is followed by the more specifically illustrated example of Polynesia and a detailed case study of New Zealand, which includes details on the ecology of introduced species of particular significance to LHI. This area also has special significance due to the regional proximity of Polynesia (and New Zealand in particular) to LHI; the resulting similarities of biota and climate; the historic relevance of the regions contact with later European peoples and the resulting social and environmental impacts; the initial Polynesian (New Zealand Maori) influence of LHI's first settlers; and the wealth of studies of (prehistoric) island colonisation in Polynesia. Further, the New Zealand case study provides a clear illustration of the pre-European situation in the region, which has particular relevance to later historic events which directly relate to LHI and are presently discussed.

A general overview of the nature of European presence in the Pacific and how their differing cultural background and economic motivations influenced their impact follows, and is used to illustrate the similar and contrasting aspects of island colonisation by different cultural groups operating in different social and historic contexts. This is followed by a more detailed look at the Galapagos Islands as an example of European island colonisation to provide a comparative case; not only with regards to the similarities and differences of between Polynesian and European island colonisations, but also as a reference case of European colonisation of a *naïve* island environment. A further link to LHI lies in the economic background of the early colonists of the Galapagos, whalers and sealers, which in turn requires an examination of their influence in the Pacific and the social, environmental, and archaeological signatures of their presence in the Australia and New Zealand in particular. An understanding of the whaling and sealing culture and minutiae of their everyday existence has especial relevance to LHI, as its settlement is directly related to the needs of these industries and the first settlers of the island where British whalers who had plied their trade in New Zealand before coming to the island in the company of Maori women and men. Aside from the influences of these maritime trades, another pervasive influence on the development of all island settlements (prehistoric as well is historic) is that of isolation. Isolation is arguably the one of the most significant defining characteristics of islands, with most if not all features of islands (be it ecological or cultural) cascading from this one factor. The different types and influences of isolation are therefore discussed in view of LHI's historic and cultural context, and provides a backdrop to understanding certain types of behaviour (and therefore archaeology) which may not otherwise be explained by the numerous other influences at play on LHI discussed previously.

Thus, there are several interwoven historic and theoretical contexts within which this project is situated, and are discussed below. As mentioned, the general overarching framework taken to this project is one that can be loosely termed a 'landscape' approach; however this is something that requires some discussion and explanation, before exploring in more depth the themes identified above.

Landscapes: constant yet ever-changing, ephemeral yet pervasive

Landscapes, or as they have been known in earlier discussions, 'cultural landscapes' are a dynamic, complex and far-reaching concept in current archaeological study, and encourages much discourse within archaeology and between it and several other disciplines. 'Cultural landscapes' can be seen to exist anywhere that humans exist, as the very act of living and

experiencing the world around you creates a cultural landscape. More recent archaeological papers on ‘cultural landscapes’ often refer to them merely as ‘landscapes’ as they describe landscape (both the physical and the metaphysical) as a cultural construct of perception and ideology and thus, ‘landscapes’ are cultural (Bender 1993; Cosgrove 1984; Thomas 1993; Tilley 1994). Such discussions address past approaches which separated the physical from the metaphysical: landscape as an object vs as a subject. This dichotomy is generally now seen as artificial, as any study of landscapes that hopes to have more than a glancing understanding of human life ways in the past cannot do so effectively without taking into consideration the non-physical elements (Darvill 1999; Thomas 2001). As such, landscapes can exist at any time, anywhere, and are defined by the historical, environmental, political, cultural, social and personal context within which they are shaped and used. With each successive generation, the landscape becomes increasingly layered with variations of meaning and use, while retaining common threads – physical features, stories, histories, memories and so on; all constituting a continuation. Bender (1993: 2) elaborates:

“The way in which people – anywhere, everywhere – understand and engage with their worlds will depend upon the specific time and place and historical conditions. It will depend upon their gender, age, class, caste, and on their social and economic situation...People’s landscapes will operate on very different spatial scales, whether horizontally across the surface of the world, or vertically – up to the heavens, down to the depths. They will operate on very different temporal scales, engaging with the past and with the future in many different ways”.

Thus, landscapes represent a paradox and analytical problem, as they are constantly changing and yet retain a certain permanency. This dynamic nature of landscapes makes them both interesting and challenging to study; they have an ambiguous and completely contextual nature, but at the same time constitute very real and strong elements of human action and feeling over time.

The complex nature of landscapes and the challenges of studying and understanding them introduces theory and discussion from several disciplines including geography, architecture, anthropology, sociology, literature, history and archaeology and heritage studies. An exploration of all the intricacies of different discussions, definitions and approaches to landscapes is well outside the scope of this project, and the particular definition one adopts for this concept is highly reliant on the context in which the concept is being used. Discussions of landscape cover the whole spectrum of human experience with focus being on the relatively intangible experiential

elements at one end and the actual physical rocks, dirt, water, vegetation, animals, people, bricks and mortar etc at the other. The main commonality throughout these different scales of view is the acknowledgement that (from an archaeological point of view) a discrete, literally physical ‘site’ approach leads to the exclusion of much if not most of the available data on how the particular people who are being studied operated in the world. As Byrne (2001) writes:

“The accuracy with which the archaeologist plots the ‘site’ on the map disguises the gross *inaccuracy* of the whole recording exercise. It is a misrepresentation of social reality. The ‘site’ in this case didn’t exist for them as an independent place. To think of it in that way was like taking a bead off a necklace, holding it up between your fingers and saying, ‘this is a necklace’” (Byrne in Byrne, Brayshaw and Ireland 2001: 52).

Whether a study is concerned with more intangible aspects of human experience or the more nitty gritty everyday details of a people living in the world, this acknowledgement of the need to look beyond the bounds of discrete physical locations includes recognition of the multilayered and complex nature of human experience. This allows a much broader range of research questions beyond ‘what did they eat at site x’, ‘what did houses look like at site x’ etc to be addressed in meaningful ways. People do not exist in static points on the map; living in the world creates networks of locales of activity within a landscape, with pathways, landmarks, smells, textures, weather patterns, histories, mythologies etc existing between, around and through the more traditionally identified ‘sites’ of activity (and of past focus). The research possibilities of this extended view are as numerous and diverse as the locations in which people live and include: modes of production, power relations and the social reproduction of ideologies; spatial and material cultural arrangements in relation to gender, class, religion, race, other forms of identity and consumer patterns; and bigger picture concerns such as residential and industrial ‘site’ formation, technological development and land division and use (eg. Beaudry 1989; Burke 1999; Cosgrove 1984; Gardiner and Knox 1997; Lamb 1989; Lennon 1997; Leone and Potter 1999; Orser and Nekola 1996; Rotman and Nassaney 1997; Stevenson 1998; Zierden 1996).

In relation to LHI, the ‘landscape’ approach that is being adopted for this project is not particularly complex or detailed, but is significant nevertheless. Rather than having a handful of sites and contained samples of LHI life at static points in time, this project seeks to combine the samples of information provided by the in-depth site based investigations with the larger history of the island, Pacific and the relevant maritime industries; and a reconstruction of the physical and partial social landscape of the settlement through time (through the mechanism of the colour coded maps in chapter six) and in-depth discussions of the environmental and community

changes that took place. It is fully acknowledged that mapping is an exercise that has its own constraints with regards to ‘defining’ much that is indefinable about settlers’ experiences, movements and interactions with the LHI environment. However, with this in mind it is not within the purview of this project to deal with the more intangible aspects of LHI colonisation and settlement, but rather to grasp a basic understanding of the development of the LHI settlement landscape in terms of settlement location, abandonment, relocation and resettlement; resource location, use, exhaustion, abandonment, rehabilitation and reuse; industry establishment, development and decline; the evolution of basic social/community customs and facilities and their attendant environmental impacts. This basic examination of the fundamental physical aspects of LHI’s colonisation and settlement will allow future studies to successfully build upon this an understanding of finer details, which have numerous research possibilities and particular implications for the management of the island’s cultural heritage. Of the numerous facets of the LHI landscape, the fact that it is an island is highly significant, and greatly influences much that is of research interest to this project (see above). Firstly, it has a significant impact on the ecological nature of the island, and the details of this are discussed in the next section.

Island Colonisations: voyages of discovery and change

The consequences of new species arriving in previously naïve habitats are complex and diverse, and are the subject of intense study across many disciplines. Not least of these possible species of interest are *Homo sapiens*, who have in modern times achieved a global range unmatched by any other. The study of how humans have arrived at their current world distribution encompasses not only concentrated study of continental occupations, but that of islands which are subject to particularly intense scrutiny due to a range of factors, including: they often act as stepping stones between larger landmasses; their colonisation can be indicative of particular cultural and technological achievements; and islands are seen as offering contained microcosms of human/environmental interactions that can inform other environmental and anthropological studies (Burney 1997; Fitzhugh and Hunt 1997; Kirch 1997). Human colonisations of island environments are also of particular interest as such events usually also involve the arrival of a whole suite of new floral and faunal species directly associated with humans, either as domestic/semi-domestic species or as opportunistic species which may or may not have economic value in their own right. Thus the arrival of humans usually provides an opportunity to study a broad ‘frontier’ of interactions between introduced and native species, and

allows some measure of the influence human husbandry and predation of species has on their success and ability to compete for ecological niches.

As a product of concentrated study and common mechanisms involved in colonising islands, patterns of ecological change and/or stability have been found to be remarkably consistent across all regions of the world. Islands as diverse in location, size, ecology and isolation as Madagascar, Mauritius, the Canary Islands, Crete, Cyprus, Sardinia, the Indonesian archipelago, New Guinea, Hawaii, Easter Island, the Galapagos Islands and New Zealand all show similar patterns of environmental and ecological change as a direct result of human contact and occupation. Extinction, extirpation (localised extinction of larger ranging species) and/or reduced populations of natively occurring terrestrial and/or marine species appear to occur universally in island contexts following human arrival which, where data is available, are above the ‘background’ rate of naturally occurring extinctions prior to contact (Burney 1997; Spriggs 2001; Steadman 1997). The species most seriously affected and the circumstances of their decline vary somewhat between contexts; however there are several broadly occurring patterns: terrestrial faunas experience the most severe reductions; avifauna are particularly vulnerable; faunal attrition is most often attributable to a combination of human predation, introduced species predation and competition and habitat alteration, reduction or destruction (Anderson and McGlone 1991; Alcover, Sans and Palmer 1998; Burney 1997; Diamond 2005; Harada and Glasby 1999; Kirch 1982; Kirch and Hunt 1997; Milberg and Tyrberg 1993; Morwood and Oosterzee 2007; Rainbird 2002; Rolett and Diamond 2004; Simmons 1999; Schule 1993; Spriggs 2001). Further, the extent and rate of change that occurs directly relates to several island, cultural and temporal specific factors (see below).

The ‘contained’ nature of islands that makes them attractive as microcosmic studies of environmental and cultural interactions also makes their biota especially vulnerable to change and extinction as a result of these interactions. The particular problem presented by islands to colonising faunas and floras, (that is crossing bodies of water of varying magnitude) in turn influences the subsequent evolution of island flora and fauna, particularly terrestrially bound species. Dependant upon a particular islands proximity to other landmasses (continental or island) as sources of new colonising species, the presence or absence of significant barriers (such as prevailing winds, currents, deep or rough water crossings) and the geological origin of the island itself; its biota will exhibit a degree of endemism proportionate to its relative isolation as defined by the above factors.

This specialisation of island species takes many forms, but common among more isolated islands is the lack of terrestrial non-avian species, which in turn encourages radiation and eventually speciation among those present to fill empty ecological niches. Other effects include the loss or reduction of flight (in birds and insects), an increase or decrease in body size, reduced rates of reproduction and loss of ‘fight or flight’ behaviours in many land species due to the absence of predatory and competition pressure from other land species (Burney 1997; Morwood and Oosterzee 2007; Simmons 1999; Steadman 1997). Obvious, well known examples of these phenomena include the 11 species of the large flightless New Zealand Moa; 15 subspecies of the giant Galapagos Tortoise and two species of large iguana; the giant monitor of Flores the Komodo Dragon; at least 32 species of Madagascan Lemurs and the poster-child of losers in the island colonisation story; the large, docile, flightless Dodo of Mauritius (Anderson 1989, Anderson 1997; De Vries 1984; Morwood and Oosterzee 2007; Thorton 1971; Young 1999). The particular idiosyncrasies of island faunas and consequently altered evolutionary pressures also shape unique plant communities; rates of endemism in floral species on islands are significantly higher than continental contexts. Although perhaps not as immediately obvious as in fauna, the consequences of isolation for floral species are no less severe, as reduced rates of reproduction and growth, and reduced or absent defences against ‘predation’ often feature in island endemic floras: the complete deforestation of Easter Island is a well known example, which included the extinction of its giant, slow growing native palm (Diamond 2005). Similarly, the introduction of the Australian Brushtail Possum (*Trichosurus vulpecular*) into New Zealand has resulted in unexpected degradation of particular plant communities, which evolved in the complete absence of arboreal browsers and lack the toxic and unpalatable oils that are present in many Australian floral species as a defence against excessive marsupial appetites (Cowan, Chilvers, Efford and McElrea 1997).

This pattern of shift in size and behaviour led to numerous instances of islands populated by smorgasbords of large, fat, flightless and fearless birds, giant tortoises, pygmy hippopotamus and elephant, deer, goats and pigs that were island bound and vulnerable to predation by passing human voyagers, newly arrived colonists and their imported animals. Dependant upon the economic nature of the colonising people, the needs of hunting, gathering, fishing, agriculture, arboriculture, building, tool manufacture, firewood and other cultural requirements also led to significant losses, as they provided added impetus to mould the terrain of newly inhabited lands to fulfil the colonists’ needs. Alteration or outright clearance of plant communities, grazing, browsing and foraging by new species, earthworks and slippages, introduction of new fire

regimes, surface and subterranean quarrying and creation of fish traps and ponds all serve to significantly alter some or all existing habitats in island environments. These changes, whether rapid or gradual considerably affect the viability of native species, and in many instances appear to have an equal or greater impact than predation by humans and their exotic companions.

Numerous islands around the world have experienced to some extent the general pattern of ecological change that heralds the arrival of humans, whether the contact occurred tens of 1000s, 1000 or 200 years ago. The exact forms and rates of change that occur are significantly effected by island size, location, native species, cultural origin of the colonists, their economic strategy and the time at which colonisation takes place. Numerous studies recognise the value in examining not only the minutiae of specific island stories, but the necessity of making local inter-island comparisons in order to establish more particular regional patterns of colonisation. These regional studies have wide implications, encompassing specific and integrated archaeological, anthropological, biological, palaeontological, ecological, economic and conservational concerns. The vast numbers of Pacific islands offer a particularly broad scope for studying human/island ‘encounters’, with the colonisation of Polynesia in particular being one of the most intensively studied regions within Oceania. Several recognisable patterns consistently emerge from Polynesian island colonisations, which have particular relevance to LHI in view of its partially shared biota with a couple of Polynesian islands; its proximity to the most remote south-western outposts, Norfolk Island and New Zealand; and most importantly its same circumstance of being colonised by agriculturalists and their attendant animals (Kirch 1997; Anderson and White 2001).

Colonisation Impacts in Polynesia: hunters, gatherers, farmers and fishers

The peopling of the Pacific is the subject of numerous studies, which are concerned with the timing, circumstances and consequences of these events. The division of Oceania into three regions, Melanesia, Micronesia and Polynesia reflects loosely defined differences in population, language and culture. These differences are relatively minor, as archaeological and linguistic evidence indicates that common agricultural ancestors from the vicinity of Taiwan (the Austronesians) swept through much of South East Asia, into Indonesia, across the islands north of New Guinea and into Oceania starting from approximately 6000 years ago. This mass movement almost completely replaced the earlier inhabitants who were the likely originating populations for the Australian, New Guinean and nearer Melanesian island colonists tens of thousands years prior (Bellwood 1996; Diamond 1997; Spriggs 1996; Spriggs 2001). The dating and tracing of the progression of this ‘Austronesian Expansion’ is an important and contentious

issue, and a review of such discussions is not practical or required here. The 5500 year Polynesian expansion eventually culminated in the colonisation of the most southerly extremes of Polynesia, New Zealand 800-1000 years ago, the Chatham Islands 700-800 years ago and the Kermadecs approximately 600 years ago (Anderson 1991a; Diamond 1997; Kirch 2000; Spriggs and Anderson 1993). The colonisation and eventual abandonment of ‘mystery’ island Norfolk, as revealed by recent investigations has expanded the traditional geographical boundaries of Polynesia, and extended the period of exploration and colonisation to within the approximately the last 400 years, contemporary with the first concentrated European forays into the Pacific (Anderson and White 2001). The potential for LHI to be a similar outlier for Polynesian or Melanesian expansion was long considered, and was an even more tantalising prospect following the confirmation of Norfolk occupation; alas as discussed previously no evidence of prehistoric occupation surfaced on LHI, and it remains outside the bounds of the Austronesian Expansion. Nevertheless, the Polynesian story relates to LHI, not only as multiple examples of the possible results of island colonisation by agriculturalists, but also as a direct link to the cultural background and experience of LHI’s first colonists. The first permanent settlers on LHI were a small group comprising three Maori women, at least one Maori man, and three European men who had been residing and working amongst the Maori for a number of years prior to their arrival on LHI, and the influence of the Maori’s cultural origins and the European’s recent experience of subsisting in a foreign land somewhat analogous to LHI must be considered.

The Austronesian expansion into Polynesia and its environmental consequences is driven by the specific ecological and geological circumstances of the island in question and the successful introduction of some or all of the range of companion species which made up an important part of the cultural package transported by the colonists. The specific vulnerability or robustness of an island (or archipelago) environment is governed by a number of cultural and natural factors, the latter of which have been considered in detail by Rolett and Diamond (2004). In particular they identify key factors in island vulnerability to deforestation which has multiple associated difficulties such as loss and/or replacement of floral species (and by extension loss or reduction of habitats and dependant fauna) land slippage, erosion and soil loss, and turbidity of freshwater sources and coastal marine habitats.

In general, native forest survival or loss is a product of whether regrowth rates can match removal rates which are in turn determined by a number of factors: rainfall, latitude (essentially temperature), soil nutrient levels, accessibility and suitability for agriculture of island terrain, island size and distance from neighbouring islands. Wetter, hotter, larger, steeper, geologically

younger and less isolated islands are overall less vulnerable than those that exhibit their opposite characteristics. The more unfavourable characteristics an island has, the more vulnerable the environment, and these factors were predicted correctly the known level of deforestation present on the perennial example of extreme human impact, Easter Island:

“...of our 69 islands, it has the lowest tephra and dust fallout, the second greatest isolation and third highest latitude...and is relatively low, small and dry. On the basis of those independent variables, our...models predict correctly that Easter should have the third highest deforestation score, exceeded only by Necker and Nihoa, which also ended up completely deforested. That is, Easter’s collapse was not because its people were especially improvident but because they faced one of the Pacific’s most fragile environments”(Rolett and Diamond 2004: 445).

These geographical and environmental factors greatly influence the success of traditional Polynesian crops and the lengths to which colonists are required to go in order to foster the success of their staple foods, all of which are derived from tropical climates. While most of Polynesia lies within the tropics, environmental factors as described above determine the success of such crops. Accompanying these crops were also a range of potential weed species, which while having their own impacts on the new floral landscape affected the success or failure of new introduced domesticates (Kirch 1982). Island specific factors, particularly isolation and availability of food sources (either successful cultigens or suitable native foods) also influenced the range of domesticated animals that arrived and survived on islands. The suite of Austronesian domesticated animals that were transported to Polynesia comprised of the dog (*Canis familiaris*), pig (*Sus scrofa*) and chicken (*Gallus gallus*), while the Pacific rat (*Rattus exulans*) was most likely a wily stow-away in voyagers’ vessels but may have been an intentional introduction in some places (Diamond 1997; Diamond 2005; Kirch 1982; Kirch 2000; Steadman 1997). Other unintentional introductions may also include geckos, skinks, snails, arthropods and other invertebrates, dependant upon the particular circumstances of colonisation (Kirch 1982). Each of the main domesticates and rats have particular impacts on their environment, and consequently have recognisable patterns of influence in the overall colonisation process on naïve islands, while the impacts of other introduced species are less visible and would generally lie in the realm of competition with native species.

All four species are or may be used as food sources and exist in varying states of domesticity, dependant upon the needs of society and the island terrain. Pigs and chickens may be allowed to roam in a free or semi free range state, kept penned in settlement areas or a mixture of both. Free ranging pigs are particularly efficient foragers; shifting leaf litter and soil for seeds,

fruits, roots, rhizomes, fungi, insects, worms and molluscs; browsing on low growing vegetation and seedlings; eating eggs and chicks of ground nesting birds; and foraging along beaches and exposed tidal flats for bird and turtle eggs, molluscs, crustaceans and sea weed (Dowding and Murphy 2001; Hoeck 1984; Recher and Clark 1974; Thorton 1971). These activities serve to reduce the reproductive outcomes for plants, birds, reptiles and invertebrates through direct predation, competition for food and disturbance or destruction of habitat. Chickens similarly forage in leaf litter and soil for invertebrates and compete with existing foraging birds for food and roosting sites. Dogs are generally more likely to be kept as domestic animals for hunting and to prevent any stock losses from free ranging wild dogs. Nevertheless even kept dogs are potential predators of ground nesting birds, chicks and eggs and may scavenge shore lines and tidal flats for bird and turtle eggs, molluscs and crustaceans (Barnett and Rudd 1983; Daniel and Bekoff 1989; Hoeck 1984; Vickery, Hunter and Wells 1992). Rats, which for the most part seem to be an opportunistic stowaway and only an occasional human supper, were by nature free ranging, and are particularly hardy and successful in numerous environments. Small, nimble, excellent climbers and fast breeders, rats are particularly suited to prey on ground and tree dwelling birds, eggs and chicks, small reptiles, terrestrial molluscs and other invertebrates at such a rate that is particularly detrimental (Anderson 1997; Steadman 1997). Fruits and seeds were also prime rat food, which further served to reduce native plant reproduction, which may also be steadily replaced by introduced plant species that had the benefit of human husbandry and possible pest control. The successful introduction of these animals was highly reliant on viable stock surviving voyages; where islands become increasingly isolated, the incidence of one or more of these domesticates drops due to the longer voyaging required for initial colonisation and the reduced likelihood of subsequent voyages. Once stock did arrive, their continued success was dictated by the existence of suitable food sources (wild, domestic or both) and the presence or creation of suitable ‘habitats’ (for either free ranging or penned animals). The presence or absence of one or more of these species is not an absolute indicator of faunal reductions and extinctions, but rather part of the cumulative changes brought by human colonists which have varied degrees of impact on different island contexts.

The relative success or failure of crops and animals not only influenced the clearance/extinction, alteration or retention of native floral and faunal communities as discussed above, it also impacted upon the reliance of colonists on native food sources. The variety, abundance and robustness/vulnerability of these foods are somewhat tied to those island environmental factors described above, as generally more impoverished environments will

support fewer varieties of species suitable for exploitation. Marine based food resources are less tied to the limiting factors described previously, although they are not entirely free from their influence. Island location (in relation to prevailing currents and winds) and formation (continental, volcanic, sand atoll, and/or uplifted reef), and the resulting availability of marine habitats of varying depth, coastal formation and access, and nutrient levels all influence the type of resources available and the ease of access to them. Tropical versus subtropical or temperate latitudes are less important, as the relative abundance of fish and shellfish communities are not necessarily disparate, and where extreme latitude does influence this abundance, potential compensations include greater access to seal colonies of different species and increased possibility of cetacean catches or strandings. In the case of New Zealand, the influence of distance, latitude and unsuitable crop conditions on human subsistence and impacts on native flora and fauna can be seen across the North and South islands. While it is recognised that New Zealand being the largest island in Polynesia by an enormous margin somewhat limits the validity of wholesale comparisons to other Polynesian islands (given its size, location across several latitudes, and resulting diversity of environments), the limitations to colonists and their domesticates presented by this island group remains instructive, particularly given that LHI is the necessary comparative case, rather than Polynesia.

The colonisation of New Zealand saw the arrival of ocean going craft packed with people and their companion species dog, rat, sweet potato, taro, yam and gourd. Banana, coconut, breadfruit, sugar cane, pigs and chickens may have also made the journey, but the tropical crops would have failed any attempts of cultivation in temperate New Zealand, while any pigs or chickens that may have embarked on the outward journey did not survive the voyage/s (Anderson 1997; Best 1925; McFadgen 1987; Leach 1987). Of the crops that did survive, areas suitable for their cultivation and subsequent yield levels were limited; of the four surviving cultigens, only the sweet potato became wide spread as a food crop (Anderson 1997; McFadgen 1987; Leach 1987). The cultivation of even this crop was marginal and required considerable effort, and the general lack of previously reliable crop staples in a new land led to greater reliance on native food sources, especially on the South island (Anderson 1997; McFadgen 1987). Following the failure and/or poor performance of most introduced crops, the starchy root of the native bracken fern (*Pteridium esculentum*) became the staple source of carbohydrate for most Maori, while the stem and root of the cabbage tree (*Cordyline australis*) also provided a sweet starch of some importance in various areas (Anderson 1997; Best 1925; McFadgen 1987). The husbanding of

the fern in particular, and the cabbage palm which grows best on forest margins, involved significant vegetation change over time:

“In most parts of New Zealand bracken fern is the first coloniser after a forest fire but it must be burnt to maintain its growth against encroaching forest. With an expanding population, increased burning would have been necessary both to maintain existing stands of bracken fern and to bring in new ground” (McFadgen 1987:53).

With dog being the only domestic animal available for meat, reliance on native faunas was necessarily significant, comprising the majority of the Maori meat diet. Shore resources were especially important, with molluscs, crustaceans, echinoderms and coastal and pelagic fish species being harvested throughout the islands (Anderson 1987; Hamilton 1908; Rout 1926). Particular species of fish appear to have been targeted in some areas, with species such as Snapper (*Pagrus auratus*), Barracouta (*Thyrsites atun*) and Red Cod (*Salilota australis*) comprising very high percentages of fish remains in certain regions (Anderson 1987). Seals (predominantly Fur Seal, *Arctocephalus forsteri*) in particular were a significant resource, especially during early settlement, with both North and South island middens containing high percentages of seal bone. Dolphin and Pilot Whale (*Globicephala melaena*) remains also occur in middens, while the majority of birds harvested are also coastal species, such as shags, gulls, penguins, petrels, ducks and later Muttonbird (Anderson 1987; Hamilton 1908; Rout 1926; Smith 1989). Inland prey comprised of forest fowl such as parrots, parakeets, quail, and pigeon, fresh water fish and eels and the famed Moa, which was a favoured prey species and occurs in most middens prior to AD 1500 (Anderson 1987; Rout 1926). Despite this widespread hunting, the dietary contribution of the moa in most areas was less than that of seals. Moa were of greater significance in inland areas removed from the coast, particularly on the South island, and areas where sealing was not as intense and this was sufficient to see the sharp decline of the moa by the 15th century and its disappearance by the early 16th century (Anderson 1987; Anderson 1989; McFadgen 1987).

The decline of the moa foreshadowed that of the fur seal breeding colonies, which occurred along the entire coast of New Zealand at human contact (Anderson 1987; Smith 1989). By the 18th century, the colonies had retracted from the North island completely, and on the South island were of significantly reduced extent (Anderson 1987; Anderson 1997; Hamilton 1908; McFadgen 1987; Smith 1989). Maori sealing activity reflected this attrition, with seals no longer being a major resource north of the Otago peninsula on the south-east coast of the South island (Anderson 1987; Anderson 1997; Smith 1989). This decline coupled with the loss of moa

saw an increased reliance on dog meat, along with more intensive harvesting of shellfish and freshwater eel. Fishing in particular greatly increased in importance, and continued to be a major part of subsistence at European contact (Anderson 1987; Hamilton 1908; Rout 1926). Other faunas, including frogs, lizards, terrestrial molluscs, other large (particularly flightless) invertebrates and particularly birds experienced significant reductions, extirpations and eventual extinctions due to predation from humans, dogs and rats and habitat destruction. At least 25 species and subspecies of land birds in addition to the 11 species of moa went extinct, with further localised extinctions of other bird and animal species which often only persisted on offshore islands (Anderson 1997; Dowding and Murphy 2001; Harada and Glasby 2000; McFadgen 1987). Fish and shellfish communities saw changes in size frequency distribution, while other marine resources such as large colonies of ground nesting shearwaters and petrels are thought to have been lost due to rat predation (Anderson 1997). Other cumulative effects of the Maori occupation of New Zealand included the deforestation of one-third to one-half of the native forests due to fire; as a result of accidental firings, maintenance of fern crops and the acquisition of new land for ferns and agriculture to feed expanding populations and fill the void left by successive faunal extinctions and extirpations (Harada and Glasby 2000). Deforestation also led to increased erosion events, particularly in the high country of the South island, where the formation of scree slopes were accelerated after the loss of vegetation (Harada and Glasby 2000).

The consequences of crop failure and lack of animal domesticates are not restricted to such examples as New Zealand, as vegetation change and faunal extinctions are a feature of just about all island colonisations, as discussed above. The success of introduced domesticates may alleviate some the pressures of predation on existing species, but it does not negate such process entirely as Schule (1993, writing about a Mediterranean example) notes:

“...not even farmers could be expected to eat their goats or sheep [read pigs, dogs and chickens] when unsuspecting suppers walked everywhere. Like the Dodo, giant tortoises and so many other island vertebrates, *Myotragus* was harvested rather than hunted by newcomers...” pg 406.

Indeed, agricultural success can encourage accelerated population growth, increasing the amount of even opportunistic or occasional hunters supplementing their transported diet and thus maintaining a level of predation and subsequent collapse similar to that found where reliance on native foods is much higher. Further, the success of crops and population increases provide another pressure on habitat and the native floral regime in general, as forest clearance and/or

replacement and erosion events are already accelerated to meet the needs of an agricultural society, as opposed to a solely hunter-gatherer society (Spriggs 2001). Likewise, husbandry of domesticated animals or native ones, such as the building of fish ponds in Hawaii may also increase to meet population needs, with its associated impacts on fauna, flora and landscape formation (Burney 1997; Kirch 1982).

It is important to note that the overwhelmingly common pattern of environmental and ecological change that characterises Pacific island colonisations is not necessarily an omnidirectional process of increasing pressures on finite and vulnerable resources leading inexorably to extinctions and environmental collapse. In many examples, initial processes of change and degradation that immediately follow human arrival eventually become by necessity ‘managed’, after the consequences of transported subsistence strategies in the new environment become apparent and start to affect the lands carrying capacity (Kirch 1982; Spriggs 2001). While significant species loss is generally inevitable during this initial period, human changes to island landscapes are not necessarily detrimental to all species uniformly; new habitats are created; some existing ones expanded; and in the wake of faunal and floral extinctions or retreats, new ecological niches become available to existing or new, self-introducing species (Dowding and Murphy 2001; Hutton 1990; Kirch 1982; Steadman 1997). In the Hawaiian archipelago, landscape changes resulted in nearly all permanently watered valleys being converted into irrigated pond fields for taro agriculture, creating greater areas of marshland habitats than existed prior to colonisation. This habitat creation provided a likely opportunity for waterfowl such as ducks, gallinules and coots to establish themselves permanently on the islands:

“The absence of these species from the abundant Pleistocene avifaunal deposits may be taken as tentative evidence that they did not become established (or at least abundant) until humans created the appropriate habitats” (Kirch 1982:6).

Similar examples of marshland species and those that can tolerate or prefer open habitats (such as herons, rails, migratory shorebirds and some kingfishers, warblers, and fruit doves) continuing successfully and even thriving in the wake of human colonisation occur elsewhere, and where sources of colonising species are sufficiently close, self-introductions of new species can occur with surprising rapidity (Hutton 1990; Steadman 1997). Elsewhere, efforts to improve the agricultural outcome of certain soils have enriched previously impoverished environments, which potentially have a greater ability to regenerate during fallow periods, or after total abandonment (McFadgen 1987).

The overall pattern that emerges from the varied evidence collected and analysed from islands across the Pacific and Polynesia in particular is highly consistent, when considered within the constraints of varied environmental vulnerability and suitability for the application of the ‘transported Polynesian landscape’ (Anderson 1997; Kirch 1982; Kirch 1997; Spriggs 2001). Polynesian colonists were culturally agriculturalists, with an accompanying package of domesticated plants and animals as well as a few opportunistic species. The needs of successful crop production largely drove the type of environmental change that took place, which subsequently affected the ability of native species to cope with new predators, competitors and habitat loss. Bird extinctions and extirpations feature largely in this pattern, and are usually accompanied by losses of terrestrial invertebrates and reptiles, most of which is proportionately attributable to habitat loss, which in turn is exacerbated by predation and competition (Spriggs 2001). Once initial environmental upheavals had occurred, many island cultures were obliged to adopt a more conservative approach to their environment as the alternative, particularly on increasingly isolated islands, was to perish. Some human wrought changes had positive outcomes for a small selection of animals and plants, but the overall consequence of human colonisation was irreversible environmental change and species losses.

These processes of change continue throughout individual island histories, up to and throughout the advent of widespread European contact, from the 18th century onwards. Eventual contact and either subsequent colonisation or exchange with Europeans in the guise of explorers, collectors, missionaries, whalers, sealers, slavers and traders of copra, pearl shell, fur, timber and spices served to change the pattern of ecological modification on many Pacific islands, and the rapidity and visible nature of these changes encouraged erroneous notions of previously ‘virgin’ landscapes unaffected by their native inhabitants. This was further encouraged by the European philosophy of the ‘noble savage’ living in a harmoniously innocent idyll with nature and each other which was sensationally revived following early European voyages of Pacific exploration, most notably Bougainville’s 1768 visit to Tahiti (Cameron 1987; Kirch 1997; Moorehead 1966). Consciously or unconsciously, the general idea of technologically unsophisticated groups of people in the deep and recent past having minimal impacts on their environment persisted well beyond the lifespan of the romanticised notion of the ‘noble savage’, and influenced many early discourses in human biogeography, anthropology and archaeology (Kirch 1997a; Kirch 1997b). With increasing European influences in the Pacific, the now acknowledged patterns of change associated with Polynesian colonisations were both perpetuated and superseded by the

‘transported landscapes’ and ‘cultural package’ that Europeans brought with them during the second wave of human colonisation and re-colonisation of the Pacific.

European Island Colonisations in the Pacific: patterns of colonial change

Two features of European colonisation were significantly different to that of Polynesian colonisations: the package of transported domesticates that were brought into naïve environments and the cultural/economic impetus behind the colonising process. While Polynesian colonists were agriculturalists who were driven by the needs of survival, establishing and maintaining local trade networks, and conducting intra and inter island conquests and conflicts, the resources of their lands were never required to meet the demands of globalised economic ventures; either as direct suppliers of a high demand consumerist product, or as part of a support structure of provisioning and trading locales for highly mobile, populous industries. European colonists, arriving on inhabited, previously inhabited but subsequently abandoned and/or totally naïve islands were for the most part engaged to some extent in such ventures, and the particulars of their presence in the Pacific shaped the way in which they colonised new islands, the plants and animals that accompanied them, and the subsequent impact they had on these islands.

Another factor which has also been hotly contested in relation to the environmental impacts of the European colonial machine is the impact the Christian notion of humanity’s (and in particular Christians’) dominion over all of Earth’s bounty, overlaid with cultural aesthetics developed in environmentally different homelands had on the imported policies of use and exploitation of resources in new lands. Certainly, disparate cultural attitudes to environmental exploitation and conservation influence the impact new colonisers had in each situation, but these were driven by prevailing government, industrial, philosophical and personal values as much as any influence a Christian religious background. Indeed similar and even more destructive patterns of ecological change and resource use are found globally throughout human history, illustrating that while culture is important, it does not operate in a vacuum, with environmental factors and basic human behaviours playing a significant role. Such debates and explorations are numerous and cannot be addressed here, but clearly the cultural background of a particular colonising group is as important as that of the economic imperatives at work (Aplin 1988; Bonyhady 2000; Cannon 1973; Diamond 1997; Diamond 2005; Flannery 1994; Harada and Glasby 2000; Kirch 1997a; Kirch 1997b; Moorehead 1966; Mrozowski 1999; Rockman and Steele 2001).

As stated above, Europeans came to different areas of the Pacific with a variety of aims, many of which often coincided within a single group, or operated simultaneously by separate groups in the one area. The particular needs of these activities influenced the type of settlements and exchanges with existing populations that were established, including the introduction of new animals and crops and their attendant environmental benefits and problems. The variety of animals available for introduction on Pacific islands was tremendous, and again depended upon the particular needs of the island colonisers and environmental potential. In many instances, the introduction of known Polynesian animals into areas where they had failed to arrive previously occurred, such as the multiple introduction of the pig and chicken to New Zealand in 1769 by De Surville, Cook in 1773 and King in 1804 and 1805 (Belich 1996; Best 1925). Elsewhere rats were accidentally introduced by European voyagers, particularly the Black Rat (*Rattus rattus*) and the Norway Rat (*Rattus norvegicus*), both species being markedly more aggressive than the Pacific Rat (*Rattus exulans*). These species, particularly the Black Rat proved even more problematic for native faunas and in several instances where the Pacific Rat did occur, it disappeared in the wake of the Black Rat's arrival (Dowding and Murphy 2001; Steadman 1997). Similarly where islands have had native rodents such as the Galapagos Islands, Black Rats have out competed and probably predated on the native species which have retreated to two islands where the Black Rat does not occur (Hoeck 1984; Thorton 1971). These chance and intentional introductions of pigs, chickens, dogs and rats had much the same impact as had been experienced on other islands where they were known during Polynesian colonisation; the main difference in the impact of this second wave of animals being in the amount of highly susceptible species left to be affected by the new arrivals.

Similarly, introductions of completely new animals into the Pacific had varied measurable impact, depending upon the existing ecological state of the islands in question and the cumulative effects of numerous new species being introduced simultaneously in conjunction with human behaviours potentially driving new patterns of land use. Apart from the rats, predatory species such as the mouse (*Mus musculus*), cat (*Felis catus*), ferret (*Mustela furo*), stoat (*Mustela erminea*) and mongoose (*Herpestes auropunctatus*) were introduced in various areas either accidentally, as a means of rat and other pest control, to provide a source of fur for trade or as companion animals (Dowding and Murphy 2001; Hoeck 1984; Steadman 1997; Stone and Anderson 1988; Thorton 1971). Cat, ferret, stoat and mongoose are all efficient predators and have potentially considerable impact on island faunas, particularly ground nesting birds, small reptiles, amphibians and terrestrial invertebrates (Dowding and Murphy 2001; Hoeck 1984;

Recher and Clark 1974; Steadman 1997; Stone and Anderson 1988; Thorton 1971). Other introduced animals generally comprised domesticates of some economic value to the new European colonists and included a broad range of traditional economic animals such as cows, goats, horses, donkeys, sheep, ducks, geese, turkeys, rabbits and honey bees in addition to new breeds of pig, dog and chicken. For the most part, the ‘farmyard’ introductions were problematic in terms of some competition with native species and significant habitat change and/or destruction that occurred, either through human husbandry or direct impacts of the animals themselves. Less obvious, but no less significant has been the intentional and accidental introductions of a variety of invertebrates, in particular predatory species of land snails and insects which both compete with and predate on their native counterparts, and have cascade effects on the availability of pollinating insects for vegetation regeneration and food for native insectivorous birds (Stone and Anderson 1988).

Medium to large browsing and grazing ungulates that required either large areas of pasture (cattle, sheep and horses) or were super efficient browsers (goats, donkeys) represented significant new disturbances to island environments. Forest clearance, retreat and undergrowth disturbance from pasture creation and browsing; trail formation, erosion and desertification; and fouling, alteration and/or exhaustion of water sources are all well documented phenomena that occur not just on islands but also in continental environments where heavy hooped animals have been unknown during millions of years of isolated evolution. Similarly, rabbits have well known effects, with their burrowing habits inducing and/or exacerbating erosion and their prolific reproduction allowing them to push burrowing sea birds out of nesting areas and out-compete other species for food and water. Successful rabbits can also support inflated populations of predators such as cats and mustelids, which in turn can lead to increased pressure on native fauna in the event of a rabbit population collapse (Diamond 2005; Dowding and Murphy 2001). The impact of different introduced fowl would be much the same as that of chickens; competition for roosting sites and food with similar native birds and predation on invertebrates, with the added possibility of ducks fouling pond water sources.

As with domesticated animals, crop plants brought by European colonists were highly varied, and comprised not only traditional European domesticates, but also exotics from many tropical and sub-tropical regions outside the Pacific. In some instances the local produce of the Pacific were either introduced to islands and/or specially cultivated for the specific purpose of commercial exploitation (such as sugar in Fiji and Hawaii). The needs of such crops were consequently varied and additional clearance and alteration of native floral communities and

landscapes fluctuated from severe to negligible. A plethora of ‘weed’ species also accompanied Europeans, either as true weeds which piggy-backed onto new islands in seed bags, feed stores, animal guts and clothing or as ornamental or partially economic species which ran rampant from abandoned gardens and/or locally dispersed seeds (Meyer and Florence 1996). Rapidly growing species often colonise abandoned clearances, slip zones and breaks in forest canopies, replacing native species and in some instances actively pushing them out, even in generally undisturbed vegetation. The combined effect of competing species of plants and animals, predation, habitat and soil character change and/or destruction all placed additional pressure on the native species of Pacific islands and in most instances the impacts of these new arrivals became rapidly and abundantly clear.

The variety of European domesticates, the productivity maintained and their subsequent impacts were governed by several factors: the nature of the settlement and its particular need for permanency; outside market forces that directed what animals and crops are desired in a particular area as articles of trade for provisioning, and globally as exotic consumer goods; and the suitability of desired animals and crops to the particular island environment. Missionaries, independent settlers and some traders may all desire a certain degree of permanency and security and their efforts to introduce traditional crops and animals and/or grow/husband native crops and animals at a particular volume might be considered greater than other colonists; not only for their own subsistence but also to allow surplus for trade and perhaps also (particularly for the missionaries) to maintain a certain standard of ‘civilised living’. Other settlers and traders were more inclined or able to subsist entirely or mostly on existing crops and animals, and may have contributed only a handful of exotics over a period of time. Similarly, whaling and other trade vessels that habitually called in to numerous islands to reprovision and trade often made efforts of varying magnitude to ensure reliable supplies of desired provisions at regular anchorages. These efforts ranged from setting free numbers of desired livestock (usually goats and pigs) on sparsely populated or uninhabited islands; providing particular trading incentives to native and populations to grow and/or husband desired crops and animals; to establishing agricultural and/or trade settlements to provide reliable provisions and place of resort to break the monotony of life aboard (Belich 1996; Buzacott 1866; McNab 1913; Perry 1984; Thiercelin 1866; Thorton 1971).

The impacts of the new colonists’ changes were not just driven by new subsistence strategies or increased populations; indeed many Polynesian islands saw sharp population declines following extended European contact and the inevitable exposure to new infectious disease and escalation of local wars aided by musketry and a new desire for particular European

trade goods (Belich 1996; Buzacott 1866; Cameron 1988; Diamond 1997; Kent 1972; McNab 1913). Commercial growing of desirable tropical crops and animals required for the needs of nearby colonies, provisioning of whaling and trading ships, missionary encouraged replacement of native foods with ‘civilised fare’ and industries such as timber getting and sandalwood harvesting prompted increased forest clearances while pearl, turtle shell and *beche de mer* collecting saw greater exploitation of marine communities (Buzacott 1866; Cameron 1988; Kent 1972). These and other European activities in the Pacific influenced processes of change, and the speed at which these changes occurred after European arrival often gave a false impression of the ‘untouched’ nature of many Polynesian environments and served to overshadow the evidence of past and ongoing landscape and ecological changes as artefacts of the Austronesian colonisation.

Where Pacific islands encountered by Europeans had been previously uninhabited, the recognised processes of change that accompanied prehistoric Polynesian colonisations were largely repeated. As discussed above, the economic and cultural imperatives driving European activities in the Pacific may have accelerated many of these processes, given the particularly damaging nature of certain European hoofed and predatory domesticates on island environments. The Galapagos Islands, while strictly not within the bounds of the Polynesian triangle, are a particularly instructive case as they were uninhabited prior to European discovery, are geographically and biologically isolated whilst being situated within what became a significant network of maritime activity, industry and trade across the Pacific. The ecological and environmental consequences of a succession of differing European colonising activities on the Galapagos are numerous and are apt analogues for similar scenarios on other islands in and outside the Pacific.

Officially discovered in 1535 by a Spanish ship which had been becalmed off Peru and subsequently swept west, passenger Fray Tomas de Berlanga, the first Bishop of Panama, described the islands they came upon in a letter to the Holy Roman Emperor Charles I or Carlos V (Thorton 1971; Perry 1984). Notably, he observed the tameness of the birds and the abundance of seals, iguanas and importantly tortoises (in Spanish *galapagos*), for which the islands were named. Water was particularly scarce and the islands of such dry and harsh appearance that Fray Tomas described the soil and by extension the islands as being ‘...worthless, because it has not the power of raising a little grass...’ (Fray Tomas 1535 in Perry 1984: 1). The 13 principle islands that comprise the Galapagos archipelago are indeed largely of desert like character, the rocky terrain interspersed with large cactus, sparse scrub and the un-eroded basaltic lava flows from geologically recent volcanic activity. Despite their equatorial

position, the islands are located in a dry region of the Pacific, and are kept abnormally cool and dry by cold oceanic upwellings and prevailing south-easterly winds. Only the higher elevations of the five largest islands experience any significant rainfall and support denser vegetation, and overall the archipelago is particularly susceptible to periods of drought (Perry 1984). Nevertheless the islands support an impressive array of land and sea fauna and flora, demonstrating the high rates of endemism characteristic of isolated islands and of famous significance in the development of Darwin's theory of evolution by natural selection. Of particular significance to the human history of the islands is the 15 subspecies of land tortoise that occupy the islands, and their particular usefulness to the various groups that came to the islands following Fray Tomas' accidental landing.

The harsh and unpromising descriptions of Fray Tomas and later accidental visitors did not elicit any excited attempts to claim and settle the islands, and until the late 17th century with the arrival of mostly English buccaneers, the islands remained largely isolated and untouched. Tantalising suggestions of a pre-European human presence on the island have consisted of some shattered South American pottery, a handful of stone tools and a terracotta flute found at coastal sites on three islands; an oral account (recorded by the Spanish) of an Incan monarchs' voyage on balsa craft to destinations which may have included the Galapagos; and historic accounts of balsa rafts reaching the islands from the South American coast (Perry 1984; Thorton 1971). The presence of indigenous artefacts may be attributable to later occupations by raiding buccaneers who might have carried souvenirs and ceramic water vessels from the continent (see below). If pre-Columbian peoples did reach the Galapagos, other usual evidence of occupation is lacking, and is likely to have been either a singular event or sporadic and of little ecological significance (Perry 1984; Thorton 1971).

Following the promise of booty and perhaps a loose directive to make war upon the Spanish, private ships harrying the Spanish treasure fleets began frequenting the South American coast, and the Galapagos islands became recognised as a convenient place to regroup, refit and reprovision (Cameron 1988; Perry 1984; Thorton 1971). Once reasonably reliable sources of water were located, the combination of safe harbour, wood, water and easily caught tortoises was irresistible to raiders who could not easily call into the Spanish ports of the nearby coast. From the late 17th to the mid 18th century small but regular groups of men visited the islands and took tortoises for onshore and onboard food. The eventual decline in this activity was followed by a couple of Spanish voyages of scientific aim, and two visits in 1793 and 1794 by Capt. James Colnett, who was exploring new whaling grounds on behalf of London merchants. Colnett

recognised the suitability of the islands for ship refitting and reprovisioning (much as the buccaneers had) and following his voyage, British and later New England whaling ships began calling into the islands for this purpose. The whalers who hunted the rich east South American coast for sperm whale were closely followed by sealers, who hunted thousands of Galapagos fur seals (*Arctocephalus galapagoensis*), which breed on the shores of the archipelago. The impact of the sealers on their quarry was significant, with over 17 000 being reported as taken from the islands between 1816 and 1897, driving the population to the brink of extinction and closing the trade by 1898 (Thorton 1971). Both whaling and sealing voyages involved long periods out of port, and the Galapagos tortoises were a particularly valuable resource:

“They [tortoises] were stacked, alive, one on top of the other, in the ships’ holds, to be brought out and slaughtered as required, for their fresh meat and fine oil. It is said that the animals could survive for over a year in these conditions without food or water...in large part the Galapagos tortoises made the Pacific whaling industry possible” (Thorton 1971: 8).

Evidence of the frequency and impacts of these visits are numerous and significant: reviews of whalers logs by C.H. Townsend in 1925 showed 15 000 tortoises were removed from the islands between 1811 and 1840 by whalers alone, and other estimates put the total animals removed or killed during this time in excess of 100 000 (de Vries 1984; Perry 1984; Thorton 1971). The importance of the tortoises and the islands in general is also evidenced by the building of low stone tortoise ‘corrals’ at numerous beaches and anchorages and the establishment and maintenance of an informal post office during the late 18th century, where letters were left in a barrel to be taken on by the next ship sailing in the direction of its eventual destination (Thorton 1971). In the early 19th century, vessels were frequent enough to support the islands first permanent inhabitant, P. Watkins, who grew produce and traded with whalers for rum frequently enough to remain permanently intoxicated for at least a couple of years (Perry 1984; Thorton 1971). The first concentrated effort to establish permanent settlements on the islands occurred with the annexation of the archipelago by Ecuador in 1832 and the arrival of a group of convicts in the same year. The presence of a permanent human population and the introduction of several exotic species only increased the predation pressure on tortoises, as the new colonists also harvested them for meat and oil. By the mid 19th century, two tortoise subspecies were extinct, and all others were severely depleted, and their decline was obviously evident to visiting ships, as goats were released on four islands to provide a continued source of meat in the eventuality of tortoise collapse (de Vries 1984).

Several waves of settlers colonised different islands, brought a range of animals and grew numerous crops with varying success, leading to instances of abandonment, resettlement and changes in economic strategy. Over the course of colonisation, four islands have acquired and maintained permanent populations of some size, and livelihoods have largely been dependant on subsistence farming, small scale produce trading with outside industrial operations (such as tuna fishers) and cash crop/animal production. Extractive industries such as sulphur and salt collecting and gathering of native lichens for dye production were small scale and short lived and across most islands where human impact has been felt, it has been as a result of introduced livestock and some plants (Hoeck 1984; Thorton 1971). Introduced animals comprised dogs (*Canis familiaris*), cats (*Felis catus*), pigs (*Sus scrofa*), cattle (*Bos* sp), goats (*Capra hircus*), donkeys (*Equus asinus*), horses (*Equus caballus*), chickens (*Gallus gallus*), sheep (*Ovis aries*) and guinea pigs (*Cavia porcellus*); the former eight subsequently establishing successful feral populations of varying size, range and consequence which are in significant evidence today. Stowaway House Mice (*Mus musculus*) and Black Rats (*Rattus rattus*) also found their way to the islands, along with an unknown number of invertebrates including earthworms, spiders, moths, cockroaches and ants. Cattle, goats and donkeys are particularly significant in changing the character of island vegetation, forming stock trails and encouraging erosion. Goats are also a major competitor with tortoises and land iguanas for food and significantly alter and/or destroy bird and invertebrate habitats, while cattle and donkeys trample tortoise and land iguana nests (Hoeck 1984; Thorton 1971). Pigs and dogs are significant predators, particularly of tortoise eggs, hatchlings and individuals under 10 years of age; land and sea iguana nests and adults; while green turtle nests, fur seals, penguins, petrels and blue-footed boobies are seasonal prey (Hoeck 1984; Thorton 1971). Pigs have also destroyed vegetation by uprooting plants and prey on lizard and snake eggs and insect larvae, proving a further competitor with native birds for food (Hoeck 1984).

Rats are also an important predator in the Galapagos, despite the fact that studies on their ecology have shown that the major volume of their diet (on average 83%) is derived from plant material (Hoeck 1984). This dependence on vegetation means that populations fluctuate with available plant foods and cycles of seasons and droughts, and on the particularly dry Galapagos this mediates their impact. Nevertheless, they have had devastating effects in certain areas, particularly on tortoise hatchlings: on the small island of Pizon where rats are the only introduced predators, it was estimated that over a 10 year period between 7000 to 19000 hatchlings would have been produced, but only one young tortoise was found on the whole island (Hoeck 1984).

There is also evidence of rats contributing to the decline of dark-rumped petrels on the islands, and they are the most likely cause of the extirpation of six native rodent species through competition and/or predation (Hoeck 1984; Thorton 1971). The rats' presence also supports feral cat populations, and although they feed predominantly on the rodents they also supplement their diet with lizards, birds, insects and crustaceans (Hoeck 1984). The impacts of chickens, mice, horses, sheep, and guinea pigs are generally seen as negligible, with the lack of visible impacts failing to prompt more detailed investigation into their influence in the Galapagos Islands.

Impacts on plant communities are also varied and are dependant on the presence of introduced animals and human settlement, either in the past or present. Of the introduced livestock, goats are by far the most significant pest effecting change in vegetation communities which comprise of the retreat of forest lines; complete community change including desertification; and species extirpations and threatened extinctions (Hoeck 1984; Thorton 1971). Clearing for agriculture has been largely restricted to the wetter and more fertile uplands of the larger islands, which are also subjected to the depredations of feral cattle and horses which rely on particular thresholds of food availability (Hoeck 1984). Agricultural activity also coincides with the preferred breeding grounds of the Dark-Rumped Petrel, which have been pushed to the upper elevation limit of their habitat while also being dispatched by pigs and rats (Hoeck 1984; Thorton 1971). The most significant pest plant in the Galapagos is the guava, which spreads quickly and smothers native plant species in the highland forests of several islands. In general naturalised crop species have created fewer problems on the Galapagos Islands than elsewhere in the Pacific, but the guava is still a significant pest plant, and is aided in its spread by the wide ranging movements of feral ungulates.

The gradual recognition of the significance of the Galapagos Islands and their environments, the groups eventual World Heritage Listing and the tourist interest this has generated has seen a recent shift to conservation oriented management of the islands and changes to human activities. This change in the processes of colonisation has slowed the progression of many species towards extinction, but the consequences of 400 years of human contact and occupation of the islands are still very much apparent. Of the 48 species of land and sea birds that occur on the islands 27 are endemic, eight of which are threatened. Both species of iguana are also threatened, while the tortoise has lost at least two of 15 subspecies, with a further seven to eight under severe threat of extinction. Two species of seal and two species of shark are also threatened; while many other faunas have unknown losses (particularly insects and other invertebrates) due to a lack of early studies (IUCN 2006a). Impacts on Galapagos vegetation has

seen the severe decline of 13% of the archipelagos' native floras, with 20 species of endemic plants under immediate threat of extinction, and another 10 that have not been found in many years, indicating extinction (IUCN 2006a). Ironically, the marginality of most of the Galapagos' environments has served to curb larger scale exploitation and change: only 12% of the land area of the archipelago is settled and lies almost exclusively in the wetter fertile uplands of the larger, higher islands, but this has sustained sufficient populations of human and exotic animals to effect environments on all islands to some degree (Thorton 1971). All threatened Galapagos species are endangered as a direct result of human presence; the main differentiation between the Galapagos colonisation outcomes and that of other prehistorically occupied Pacific islands being the particular geographic and environmental conditions, length of human occupation and the influence of outside forces as a result of its particular historic context.

One of the most significant influences on the course of Galapagos settlement and environmental change has been the whale and seal trades, two industries which were of great economic, social and ecological significance in the Pacific in the 19th century. A significant force driving the frontier of 'Western' influence through the Pacific, whaling and sealing fleets were often the earliest regular visitors to inhabited islands, explorers and discoverers of significant new places, and colonisers of uninhabited islands and coasts. The provision of supplies and services to ships full of men years out from home port was an absolute necessity on the part of the vessels and a significant economic opportunity for Pacific and Australasian colonists and natives alike. The identification and/or establishment of ports of refreshment, whaling stations and sealing camps were significant aspects of these trades, and had a distinctive influence on the people, landscapes and environments surrounding, supporting and trading with them.

Pioneers and Plunderers: whalers and sealers in the Pacific in the 19th century

While being a widespread and significant economic force in the Pacific for several decades, both the whaling and sealing industries' physical presence on land was largely ephemeral and left comparatively little archaeological trace. The majority of Pacific whaling was carried out entirely on deep sea vessels which only made landfall to reprovision, while sealers camps were of necessity basic, mobile camps situated on rocky, windswept coasts adjacent to seal colonies, which moved once local seals had been harvested or seasonal abundance changed, particularly after the weaning of pups (Grady 1986; Mackay 1992; Mawer 1999; Smith 2002). Much of the historically visible evidence of their presence and influence lies in the social, economic and demographic transformations in established native societies and new European

colonies that became a common feature of whaler and sealer contact. Island economies became increasingly directed towards providing food, water, wood, trade items and sexual services in exchange for weapons, tools, alcohol, tobacco, new crops and livestock, clothing and other previously unknown European items of practical and prestige value. Infant colonies were in many instances reliant on the revenues and employment generated by these trades while paradoxically abhorring their negative social influence (see chapter three), but despite their importance, accounts of the minutiae of the whaling and sealing life are hard to find.

Captains' logs for the most part provide bare bone accounts of everyday life amongst the necessary navigational notes and hunting successes and failures, while crew accounts are rare due to most being illiterate and/or unable or unwilling to access expensive writing materials (Mawer 1999). Thus, while there is a fair amount of primary materials, they largely cover the business aspects of the each trade, rather than the lifestyles or finer details of industrial process. As such, archaeological remains of these industries provide the most detailed evidence of the lives and work associated with sealing and whaling and are comprised of several types of sites: sealing camps, shore based whaling stations, and off season settlements/ports of refreshment where some whalers and sealers either lived between seasons and/or retired to when they gave up the trade for a more settled life. Sealers camps are few and generally contain limited remains, due to their scattered, mostly ephemeral nature and frequent location on rocky, exposed coastlines that are generally not conducive to burial of occupation layers or open air preservation of largely perishable evidence such as barrels, skins, bones, and camp fires (Pearson and Stehberg 2006; Smith 2002). Whaling settlements, of both industrial and domestic nature are more numerous and more permanent than sealers camps, and are the main source of information about whaling lifestyles in the 19th century.

Unlike deep sea whaling, shore whaling was restricted to coasts that had close access to migration routes of several whale species to and from the Arctic and Antarctic, and/or were frequented by shore breeding species. In the southern Pacific, a number of shore whaling stations were established around the coasts of New Zealand, Tasmania and southern Australia, and on a handful of offshore islands such as the Chathams, Campbell and later Norfolk (Gojak 1998; Lawrence and Staniforth 1998; Prickett 2002; Richards 1982). These shore stations varied greatly in physical and population size, quality and type of facilities, productivity and longevity and were occupied on both seasonal and permanent basis, dependant upon their location and availability of out of season trade ventures, such as bark cutting, timber getting, fur trapping, farm labour and so on (Gibbs 1998; Gojak 1998; Jacomb 1998; Lawrence 2006; Lennon 1998;

Mackay 1992; McKenzie 1998; Nash 1998). Some stations were owned by successful businessmen or large mercantile groups and were generally one part of a larger portfolio of colonial investment; where other investments required time to mature, whaling (and sealing) provided a quick source of cash return which propped up other interests and kept the hunt going for another season (Gojak 1998; Lawrence 2006; Nash 1998; Prickett 2002). Others were established as part of networks of stations owned by the one firm which had concentrated investment in the whaling industry, and often purchased or absorbed independent stations in the advent of owner bankruptcy or misadventure (Prickett 2002). Some smaller operations were run by owner managers whom were often crewmen from pelagic whalers come to shore to continue their trade in a more settled manner, or were shore whalers who had sufficient resources to purchase or establish their own stations (Gibbs 1998; Prickett 2002).

Regardless of the ownership of the stations, the core occupants of them rarely varied. The stations employed crews of men which, depending on the size of the station may have numbered upwards of 20 to 30 per season. These crews were comprised predominantly of ordinary sea men with a handful of ‘officers’; skilled sailors/whalers such as harpooners, boat steerers and headsmen which along with any permanent tradesmen such as a cooper, carpenter, blacksmith, cook or baker usually formed a small ‘upper class’ on the stations as they collected higher wages, had better accommodations and had different rights to provisions, (Gibbs 1998; Kostoglou 1998; Lawrence 2006; McKenzie 1998). The cultural backgrounds of the crews were highly mixed, and could comprise of both imported workers from Britain, Europe, America, and numerous Pacific islands and native born workers of colonial, Aboriginal or Maori descent. What did vary more is the occurrence of women on the stations, as either informal partners or formal spouses and their accompanying children. For the most part, stations were built and operated as a single men’s settlement, and the facilities and equipment generally reflected that. Although dependant upon the capital investment and number of crew, stations nevertheless followed a common pattern of crew facilities consisting of shared barrack accommodations for the boat crews, separate shared or single quarters for the higher ranked workers, a common cooking/mess area and any number of auxiliary industrial, storage and service buildings (Kostoglou 1998; Lawrence 2006; Nash 1998). The size and quality of construction of these buildings was dependant upon the capital investment, local availability of materials and the success of the stations. Structures varied from ramshackle turf, bark, tin or dry stone huts, to sturdy timber, thatch and mason built stone structures intended to last many seasons (Kostoglou 1998; Lawrence 2006; McKenzie 1998; Prickett 2002).

Notable exceptions to the ‘bachelor’ built facilities may be some of the smaller and owner/permanent manager operated stations; in an example at Cheyne’s Beach in Western Australia, archaeological and historic evidence strongly suggests that manager John Thomas’ wife and three daughters resided at the station with him in a private dwelling separate from the crew accommodations (Gibbs 1998). Further, while the Thomas’ ate a similar diet to the crew and were situated 50 kilometres from the nearest settlement, Mrs Thomas made efforts to maintain a certain standard of living in the family quarters, as reflected by a number of good quality matching ceramics and personal items which would be expected in a middle class household (Gibbs 1998). Another example at a station at Streaky Bay in South Australia documents the presence of at least two European women and one child for the duration of at least one season in the 1840s (Staniforth 1998). There are many documented instances of captains of pelagic whaling ships being accompanied by their wives and children, particularly American whalers who were years out of port, however there are also known instances of Hobart whaling captains being accompanied by their families (Druett 1991; Lawrence 1998; Whipple 1979).

Elsewhere, despite the original function of most stations as a seasonal camp of single men living a bachelor’s life for the duration, this social isolation did not necessarily last long. Many Australian and New Zealand stations and camps were either established adjacent to existing native settlements, or precipitated the establishment of new native camps close to the station activities to take advantage of new trade opportunities and rich sources of free food (whale meat: Druett 1991; Gibbs 1998; Jacomb 1998; Lawrence 2006; Mackay 1992). The dynamics of these exchanges varied greatly, with produce, other goods, labour, liquor and companionship being traded in an atmosphere that ranged from cheerful goodwill, cautious co-operation, coercion and open hostility. Relationships between whalers, sealers and native women inevitably occurred and included short lived flings, co-habitation for the duration of one season (often known as ‘season wives’), on-going seasonal relationships and permanent relationships throughout the year which may or may not eventually be legally formalised. The level of consent and fondness involved in these relationships differed greatly with kidnapping, sexual slavery, prostitution, casual companionship and affectionate partnerships and marriages all occurring as part of the shore lifestyles of sealers and whalers (Druett 1991; Jacomb 1998; Kostoglou 1998; Mackay 1992; Whipple 1979).

Such exchanges and arrangements were also an equally common feature in ‘ports of refreshment’ which sealers and both shore and pelagic whalers frequented during and after the season. Many of the early children born in New Zealand were the product of whalers/sealers and

their native companions, and similarly the offspring of passing whalers and other traders were among the first European descendants to live on numerous Pacific islands (Anderson 1991b; Druett 1991; Mackay 1992; Prickett 1998; Whipple 1979). The subsequent care of these children often fell to the women and their families; however there were many instances of whalers and sealers establishing permanent family households at stations and nearby settlements in the off-season and engaging in farming and other ventures, particularly in New Zealand (Druett 1991; Jacomb 1998; Kostoglou 1998; Lennon 1998; Mackay 1992; Prickett 1998). A handful of contemporary observers recorded the form of settlements and dwellings created by active and retired whalers living in New Zealand:

“The huts of the residents were built on the southern slope of some well wooded hills, and being white-washed, and having near them green enclosures of corn and potatoes, presented, while shone on by the morning sun, the most smiling and refreshing aspect imaginable” (Shortland 1843 in Mackay 1992:30).

“Some of the houses were substantial wooden buildings, but the majority had thatched walls of liands and bulrushes, with a roof of the same materials. They consisted of one floor, and contained two or more rooms, with a spacious chimney. The floor is of clay firmly compressed and beaten hard. All the houses have been built by the natives, and some are not inferior to those of the villages in many parts of Europe” (Dieffenbach 1843: 37-38).

The influence of Maori building techniques in the particular structures described above is an inevitable consequence of their location in New Zealand; however they are still fitting analogues of the general layout of whalers’ dwellings (either barrack form or single dwellings for couples) that would have existed at most contemporary stations and ports, particularly those established in New Zealand, on Pacific islands and the more isolated coasts of Australia (Gibbs 1998; Kostoglou 1998; Lawrence 2006; Prickett 2002). These dwellings, especially those in ports of refreshment and at some of the more permanent whaling stations, were often part of a larger domestic complex which included vegetable gardens for kitchen and trade use, livestock such as pigs, goats, chickens and dogs and on occasion landscape modifications such as garden terraces, wells, dams and channels to redirect and ensure permanent water sources convenient to the station (Nash 1998; Prickett 2002). Produce grown in such gardens comprised of a mixture of European staples such as potatoes, pumpkins, cabbage, maize, and onions along with any native or introduced exotic crops that could be grown without too much effort. Potatoes, onions and cabbage were particularly sought produce for ships provisions due to their keeping and pickling qualities, while native staples such as taro, sweet potato, coconuts and palm hearts (or

‘cabbages’) were favoured trade crops in New Zealand and the Pacific for similar reasons (Jacomb 1998; Shephard 2000).

More ephemeral stations relied much more on imported supplies such as salt beef, pork or mutton; however where possible most temporary and permanent stations took advantage of any available native resources such as fish, shellfish, sea and land birds, eggs, and terrestrial mammals such as kangaroos, wallabies, possums and native rodents (Gibbs 1998; Kostoglou 1998; Lawrence 2006; Pearson and Stehberg 2006; Prickett 2002; Smith 2002). Seal or whale meat from respective catches was also an article of diet; however some cultural groups had distinctive preference or avoidance behaviours. American pelagic whalers habitually included whale products in their diet, but British whalers found the strong flavour particularly unpalatable and avoided it whenever possible (Gibbs 1998; Lawrence 2006; Mawer 1999). In many instances it seems seal meat was not as objectionable in taste, as sealers and whalers middens have yielded butchered seal remains, while whale and seal meat were a particularly favoured food amongst many Aboriginal and Maori groups and therefore more likely to have been eaten by such ethnic crew members and female companions with alacrity (Downes 1997; Gibbs 1998; Lawrence 2006; Pearson and Stehberg 2006; Smith 1989). Mutton birds were also a particular favourite of whalers and sealers and where available, were routinely included in the diet of the station crews and port residents (Lawrence 2006). Other sources of animal food, particularly on remote stations, ports and islands of ‘refreshment’ which had little or no permanent settlements were feral animals that had been deliberately set free to provide future game. Pigs and goats were the most frequently liberated species; while already occurring feral species such as rabbits on the Australian mainland were also readily exploited (Hoeck 1984; Lawrence 2006; Lennon 1998; Nicholls 1952; Rabone 1940). Other potential escapees were cats, rats and mice which may have been accidentally or intentionally liberated on previously naïve islands and shores, which would have had environmental consequences (Nicholls 1952; Rabone 1940).

The general impact of whalers and sealers throughout the Pacific, and in the South Pacific in particular was very similar in many aspects to the forms of change that reflect human island colonisations. New economic imperatives were introduced which influenced the way in which the landscape was used to provide a living and included the introduction of new plants and animals, the development of new hunting pressures on native faunas and new harvesting regimes of native floras. Landscape modifications were on the whole less marked, as terracing and diversion of water sources were a feature of many previously inhabited areas. Deforestation pressures may have been greater, as meeting the fuel demands of try pots on shore and ship

increased the need for firewood, and out of season employment often included timber and bark cutting, mining and other extractive industries. The varying scale and duration of their presence in different areas similarly meant differing degrees of change, and was greatly influenced by the one single factor which commonly interacts with most aspects of island colonisations: isolation.

Isolation: agent of change, adaptation, stability and stagnation.

Isolation with regards to island colonisations and the influence on cultures and colonial economic ventures such as whaling and sealing takes several forms and has a unique set of consequences. Geographical isolation, social isolation and economic isolation can all operate in concert, or may occur singularly in any given context. In many instances geographical isolation precipitates the other two, however this occurs more so in prehistoric rather than historic contexts. Geographical isolation influences the degree to which island and other isolated environments and societies are vulnerable to change; determines access to outside resources and in turn the degree of reliance on locally available resources for survival; influences the long term sustainability of resource exploitation, conservation and regeneration; and restricts peoples ability to move away in the event of environmental and resource stress. These restrictions similarly encourage local innovations and change to adapt to the local conditions and often result in distinctive cultures with regards to social structure, language, technology, subsistence strategies and trade networks. Social isolation is very strongly associated with geographical isolation, particularly in prehistory contexts, but can also be a product of particular tensions between social or ethnic groups which are otherwise geographically near.

Whalers and sealers were socially well connected in terms of broader networks of economic interaction and home life, but during the season or voyage were for the most part physically and socially isolated. Even in (foreign) port, crews moved within fairly well defined circles, participating in certain commodity and social exchanges which were divorced from the activities of many permanent residents, particularly missionaries, government officials and lay householders. Economically, their horizons were very broad, as participants in an international commodity trade which spanned both hemispheres, and during the height of their industries there were numerous international and local opportunities for expansion, innovation and branching into other industries which were complementary to main trade. In contrast, during the season or extended voyages lasting several years, geographical and social isolation fostered the development of particular words and expressions that extended beyond the usual industrial vocabulary of a shared occupation. This common language was part of what could be termed a

sub-culture, as it was also accompanied by other idiosyncratic cultural features such as recipes, card and dice games, songs and poems, folklore and handicrafts, such as scrimshaw and leatherworking (Haywood 2002; Mawer 1999; Whipple 1979). Further, a distinctive material culture, beyond the tools associated with the industrial processes of their trades, existed in many locations as necessitated and defined by groups facing similar problems with similar materials at hand with which to resolve them.

Such characteristic cultural features of particular industrial and social communities occur frequently in other instances of trades and societies whether they be defined by occupation, ethnicity or common socio-economic circumstances; however it is a phenomena which is often most pronounced in other isolated communities. Gold mining communities in the 19th century often typified the development, importation and rearranging of such ‘cultural’ groups in isolated contexts. Mass influxes of people of mixed ethnic, religious and professional backgrounds that characterised the establishment of many goldfield communities led to their general description as ‘melting pots’, which was a largely accurate description of the processes of interaction and change that occurred on many mining sites in Australia, New Zealand and the USA (Goodman 1994; Lawrence 2000; Mackay 1992; Sherer 1853). The geographical isolation common to most of these communities often necessitated levels of co-operation and mixing between groups of otherwise normally disparate people. Common language (slang, place names, technical terms), songs, music and other entertainments, architectural styles, eating patterns, technological innovations and ‘make dos’ developed due to a shared landscape, occupation and as a response to the lack of regular and/or affordable supply of conventional foods, clothing, household items, building materials and industrial equipment. Paradoxically, this common geographic isolation served to sometimes polarise existing tensions and differences between some groups due to the added strain of competition for mineral wealth and prevailing political attitudes; such as several colonial laws introduced during the Australian gold rushes to specifically the curb the participation of Chinese in the mining industry (Goodman 1994; Harvey 2001; Rolls 1992; Ward 1958).

Interestingly, while isolation often fosters innovation, change and adaptation to suit the particular conditions of the area in question, after a certain point in time it can also lead to stagnation and conservatism. The harsh conditions faced by early Australian squatters, farmers, miners and traders due to the unfamiliar climate, vegetation and vast landscape fostered an early innovative culture driven by economic powerhouses of opportunity such as grazing and mining. In the eventual ebb of such strong economic impetus, certain cultural features become part of the

established way of doing things (or more plainly, methods of survival) which persisted beyond what they did in less isolated communities (whether they be physically, socially or economically separate). This can manifest in many ways: from the urban poor's possessions being outdated, unfashionable and constantly repaired; remote but prosperous rural communities singing songs and dancing dances that haven't been seen or heard elsewhere for years; houses and buildings of inadequate design, materials and great age persisting in urban and rural settings due to lack of means or know how to improve them; to rural communities in the mid 20th century still using draught animals for farm work and transport, in addition to a high proportion of households without indoor running water or any plumbing (Cannon 1973 and 1975; Haywood 2002; Karskens 1999).

This conservatism is not always an artefact of having no choice but to cling to that which works and is available, but rather a reduced ability to take risks at considerable 'cost' on unknown 'quantities' for the sake of an intangible reward. In many instances, there is considerable evidence of many colonial communities (as well as prehistoric colonising populations) and social groups steadfastly maintaining particular social and cultural ideals, even in the face of almost absurd impracticality and often jarring juxtaposition with their circumstances. Working class men and women in many urban and rural centres often took particular care with their personal appearance, and made pains to adhere to ideals of good grooming and suitable personal adornment as signs of respectability at sizeable financial cost, particularly when fitting out their 'Sunday best' outfits (Cannon 1975; Karskens 1999). Similarly, these efforts often extended to the 'small details' of their homes. Many families living in dwellings of mean, dilapidated appearance from the outside graced their modest tables with clean linen, matched tablewares and cutlery, surrounded by whitewashed walls and precious collections of ornaments, books, shells and other mementos: precious objects which ironically may have been pawned not infrequently to provide the family with the means to purchase meat for 'Sunday dinner' (Cannon 1975; Karskens 1999).

People of perhaps greater means but more physically isolated went to similar pains to keep a respectable house, even on a whaling station 50 miles from the nearest settlement. John Thomas and his wife appear to have gone to some efforts to maintain a 'middle class' lifestyle for themselves and their three daughters at the Cheyne's Beach whaling station in Western Australia (Gibbs 1998). The incongruous reality of the Thomas family eating wallaby, dolphin or seal off good quality matched china (including vases, platters and soup tureens) in their stone cottage with glass windows and whale vertebrae floor while the faint miasma of boiling whale blubber

and aboriginal cooking fires wafting by was not by any means an unusual scenario in many isolated households (Gibbs 1998). The standard of living maintained by the Thomas family was evidently sufficient to allow at least two of their daughters to marry well in nearby Albany, and their general situation was probably not dissimilar to the standards maintained by whalers' wives travelling onboard pelagic whaling ships (Druett 1991; Gibbs 1998). This general conservatism was a common feature of many colonial communities, and was prompted not only by a form of isolation from the remainder of colonial society, but also the greater isolation from the country and culture of origin, Britain. Many aspects of Australian society maintained a distinctly British character well after Federation as a nation in 1901, and featured particularly strongly in many more isolated communities, and LHI was no exception.

Throughout its history, the LHI community and landscape have been shaped by numerous forces that operated both locally (Australia, New Zealand and the nearer Pacific) and globally. Those that are of particular interest to this project and feature largely with respect to the establishment and evolution of the LHI settlement landscape, island colonisation, the south Pacific whale fishery and isolation have been discussed above and will be explored historically and archaeologically in the following chapters.

Chapter Three

From Cook to Hitler and Beyond: Historical Context

Discovery and Descriptions

Captain James Cook's famed 18th century explorations of the Pacific can be linked with most major subsequent developments in the region in the following century, and the eventual discovery of LHI is no exception. During Cook's second voyage while en route from New Caledonia to New Zealand, he sighted, named and made preliminary explorations of Norfolk Island, 986 kilometres east-north-east of LHI. The abundance of a large conifer, the Norfolk pine (*Araucaria heterophylla*) and the New Zealand flax (*Phormium tenax*) on Norfolk prompted Cook to recommend the island as a likely source of timber for masts, spars and sailcloth for British naval ships. At the time Britain's supply of naval timbers and cloth were sourced from Russia via the Baltic Sea and concerns regarding the trade's vulnerability to blockade in the event of a European war meant alternative sources were sought (Edgecombe 1991; Hughes 1987). Thus upon the First Fleet's departure in 1787, Governor Arthur Phillip's instructions from the Crown included the directive to investigate and secure the occupation of Norfolk Island at some stage following the establishment of a colony at Botany Bay (Hughes 1987).

Within a week of arriving in Botany Bay, and in the midst of removing the fleet from the ill favoured bay to the far better Sydney Cove to the north, the fleet met unexpectedly with two French ships under the command of Jean Francois de la Perouse, undertaking an exploratory voyage of the Pacific. Not only did the sudden appearance of la Perouse precipitate Phillip's immediate departure from Botany Bay to secure Sydney Cove, the French presence in the area prompted Phillip to put into immediate action plans to settle Norfolk Island (Hughes 1987). On the 15th February 1788, only 20 days after the colony's official founding at Sydney Cove, Phillip despatched the *Supply* under Lt. Henry Lidgbird Ball to transport Lt. Philip Gidley King and 22 freemen and convicts to Norfolk Island to establish an agricultural and flax getting settlement (Hughes 1987). On the 17th of February the *Supply* sighted what was thought to be two islands and Ball named them Lord Howe's Island and Gower Island, but upon closer approach realised the islands' single nature and renamed the whole Lord Howe's Island, while the peaks were named Mt Gower, Mt Lidgbird, and the sea stack to the south-east, Ball's Pyramid. The *Supply* then sailed on for

Norfolk and upon disembarking the settlers there returned to Sydney Cove via LHI (Finch and Finch 1967; Rabone 1940).

Upon the *Supply*'s return on the 13th March, a party was landed at LHI, to claim the island for the Crown and conducted preliminary explorations. Ball named primary geographical features, produced a chart and sketches showing place names and general island views, and documented the seaward geography as much as possible. Brief accounts of flora and fauna focused mainly on the abundance and edibility of bird life, and particularly the taking of 18 turtle which were taken back to the starving and scurvy ridden throng at Sydney Cove (Finch and Finch 1967; Rabone 1940). This initial bounty was particularly welcomed by the Surgeon General, John White, as a means of relieving some of his scurvy cases, "...many of whom were in a deplorable state"(White 1788 in Finch and Finch 1967:6). Ongoing illness in the colony and the promise of more turtle prompted the *Supply*'s return on the 13th May 1788 and concurrent visits by several First Fleet transports en route to Norfolk Island and Canton: the *Charlotte*, *Lady Penrhyn* and *Scarborough*.

The *Supply*, being specifically sent to procure more turtle for the colony, returned unsuccessful to Sydney Cove on the 25th May, concluding that the winter was too advanced and the turtle had moved north for the season (Finch and Finch 1967; Rabone 1940). This failure to gain more turtle was met with no little consternation, not only for the sake of the ill who "...were languishing under the scurvy, many since dead, and there is great reason to fear that several more will soon share the same fate"(White 1788 in Finch and Finch 1967:6), but also as a general dietary relief from the monotony of salt provisions, as one diarist in Sydney wrote:

"The *Supply* tender arrived in this Cove today from Lord Howe's Island, but O Woeful News, for our Alderman-like stomachs, Not a single turtle so, for having had this ten days past, liquorish chops from the idea of 4 or 5 turtle feasts on her arrival, we are now all chop-fallen. The consolatory reason that our turtle-connoisseurs [sic] assign for this disappointment is, that, from the winter season being too far advanced, the turtle do not go on shore" (Anon 1788 in Finch and Finch 1967:9).

This failure to procure more turtle, along with general reports relating to LHI lacking sources of fresh water and sheltered deep-water anchorage led Phillip to conclude:

"...the island, not having any good water, will not be of any service to us, for Lieutenant Ball did not see any turtle, nor does he suppose they were bred there" (Phillip 1788 in Anon 1892:146).

Despite the perceived failure of LHI to provide further service to the desperate needs of the colony, the three transports that visited at the same time found a positive bounty of fresh fowl, fish and native vegetables which not only helped alleviate onboard cases of scurvy but also appreciably supplemented their supplies for their onward voyages to Canton. Crew from two of the three ships went ashore and gathered large quantities of birds and fish, with Lt Watts and surgeon Arthur Bowes of the *Lady Penrhyn* and Captain Gilbert of the *Charlotte* providing excellent descriptions of the island and the new, yet strangely familiar fauna and flora they encountered. All three describe a variety of birds which were similar, yet different to domestic and wild fowl of Europe and give reasonable descriptions of what have been later identified as the White Gallinule (*Notornis alba*), the White-throated Pigeon (*Columba vitiensis godmanae*), the Red-fronted Parakeet (*Cyanoramphus novaezelandiae subflavescens*), the Woodhen (*Tricholimnas sylvestris*), the Robust White-eye (*Zosterops strenua*), the Lord Howe Currawong (*Strepera graculina crissalis*), the Flesh-footed Shearwater (*Puffinus carneipes*) and either the Masked Booby (*Sula dactylatra*) or the debated Tasman Booby (*Sula tasmani*), which has been described exclusively from these early accounts and fossil remains recovered on LHI and Norfolk Island (Gilbert n.d.; Holdaway and Anderson 2001; Hutton 1990; Rabone 1940; van Tets, Meredith, Fullager and Davidson 1988). Common to all these accounts is the unbelievable tameness and ease of catch of the gallinule, pigeon, woodhen, shearwater and booby and the particularly good taste of pigeon and woodhen flesh and booby eggs. It seems that despite there being prized quarry identified during this forages, any bird that could be caught was killed and taken on board along with undescribed varieties of fish in incredible numbers as Arthur Bowes records:

“...many hundreds of all the sorts mention’d above, together wt. Parrots & Parraquets, Magpies & other Birds were caught and carried on board our Ship & the *Charlotte*” (Bowes 1788 in Rabone 1940:14).

Plants mentioned in the early accounts are harder to identify as they are described only by a common name, some as an unrelated plant that closely resembles it and several references made to species unknown on LHI blur the picture. General descriptions of plants mention grasses, bushes, trees and palms, but more specific references are limited to species that have a known or supposed economic value such as cabbage trees/palms, ‘coconut’ palms, scurvy grass, wild celery, spinach and samphire (Gilbert n.d.; Rabone 1940). The description of spinach likely refers to the native or New Zealand spinach

(*Tetragonia tetragonioides*), samphire to the southern grass wort (*Sarcocornia quinqueflora*), scurvy grass and wild celery to the endemic *Lepidium howei-insulae* and *Apium prostratum* respectively (Wilson 1994). References to cabbage trees or palms are more confusing as this description was commonly given by early European visitors to a number of palm species throughout the Pacific that have edible hearts and/or crowns. Lord Howe Island has four distinctive palm species, but as three occur at particular elevations or prefer slopes, the only likely species that may have been harvested for ‘cabbages’ is the thatch palm or kentia (*Howea forsteriana*) as it is widespread on the flat lowlands, often occurring in thick stands that can extend to the shore (Hutton 2002).

References to coconut trees are particularly puzzling as the most southerly occurrence of *Cocus nucifera* is currently at 27 degrees south on the South American continent, four degrees further north than LHI (Smith 1997). Earlier LHI historians have explained this anomaly in several ways: that the coconut palms referred to were mistakenly identified *Howea forsteriana* and perhaps washed up coconuts had been gathered from around the shore; that the endemic *Pandanus forsteri* was mislabelled as coconut palm and its large clusters of edible fruit supposed to be coconuts by early visitors unacquainted with tropical plants; or that there were indeed coconut palms present on the island which disappeared at some time between 1788 and first settlement. Each scenario presents problems of logic and explanation, and is further complicated by the fact that it was not one individual but many who apparently agreed upon this description as parties from at least two ships, the *Supply* and *Charlotte* collected these ‘fruits’ over several days, and a third, the *Scarborough* received some from the *Charlotte*:

Friday 16th May 1788

“Captain Ball soon after sent for me to come on board, when he acquainted me that he had anchored in the bay....He further informed me, that the island afforded plenty of fine turtle, fowls, fish, cocoa nuts, and cabbages” (Gilbert n.d.:9).

“On landing...the whole island appeared to be covered with trees, among which the mangrove, palm and cocoa nut were conspicuous, besides many kinds I was wholly unacquainted with” (Gilbert n.d.:10).

“At noon I returned to the beach...when I found the boat’s crew had not been idle; as they had collected cocoa nuts, cabbages, birds &c. and had also caught a great quantity of fish....” (Gilbert n.d.:12).

Sunday 18th May 1788

“At two in the afternoon the yawl returned, but had not turned a single turtle during the night...the boat however, was deeply laden with birds, cocoa nuts, cabbages, eggs, &c. which proved a seasonable supply to us” (Gilbert n.d.:13).

The question of coconuts is not easily solved; there was obviously a reasonable quantity of coconut-like fruit to be gathered on the island, but whether these were collected directly from fruiting trees or the ground is not described. The previous experience of the sailors involved is also hard to gauge; both Captains Ball and Gilbert commanding ships of the First Fleet were likely to be mariners of some experience, but information regarding their prior careers is scarce. On the First Fleet’s voyage out from England, it made a one-month stop in Rio de Janeiro, where coconuts most definitely occurred in 1788, and it seems reasonable to expect that at least some of the ship’s crew and captains would have become acquainted with the tree and fruit in that time (Hughes 1987). It may be possible that coconuts did occur at one time on LHI despite its southerly latitude, as it has remarkably mild temperatures due to its warm surrounding currents and microclimate. Temperature averages range across the year from 13.5 to 25.5 degrees Celsius, which is just within the lower temperature limit given by Ohler for nut survival (Australian Bureau of Meteorology 2006; Ohler 1999). Relative humidity and frequency of rainfall on LHI is also within potential limits, and as such it seems possible that coconuts may have been able to establish on the island at one time, but their growth rate and fertility would be so diminished as to render them particularly vulnerable to exploitation (Australian Bureau of Meteorology 2006; Ohler 1999).

Following the concurrent visits of the fleet transports and the *Supply*, LHI was only periodically visited, with the *Supply* making another two attempts at securing turtle for the Sydney and Norfolk Island colonies which were on the brink of starvation. En route to Norfolk Island, the *Supply* managed to catch 18 turtle on November 11th 1789, four of which were taken to Norfolk and three to Sydney. On the 7th January 1790 a small party was left on the island for 15 days, but when the *Supply* picked them up on return from Norfolk, they had only managed to secure three (Hughes 1987; Rabone 1940). The continued unreliability of LHI as a source of turtle and the eventual self-sufficiency of the colonies led to LHI being largely forgotten, with no record of any of the ships commuting between Sydney and Norfolk Island stopping at LHI for an extended period (Rabone 1940). Unfortunately the respite for LHI’s shocked and battered wildlife was relatively short lived,

as the island soon became a place of resort for whalers and trade ships that appeared with increasing frequency on the back of Sydney's establishment. Tumultuous political and economic developments that led to and resulted from the opening up of the Pacific as a vast international highway of trade, communication and enterprise did not pass even the smallest, most remote island without some impact and LHI was no exception. The advent of the Pacific whale fishery was a particular catalyst for LHI's development, and influenced many aspects of the island's flora, fauna and eventual settlement community for over 60 years.

South Sea Whaling

The commercial hunting of whales became a notable economic venture of growing significance in the northern Atlantic for Britain and its American colonies from about 1650 (Mawer 1999). Initially focussed on harvesting the North Atlantic and Greenland Right whales (*Eubalaena glacialis* and *Balaena mysticetus*), the industry's initial hunting grounds encompassed the bays and coastal waters stretching north into the Arctic Circle, where the whales migrated annually to their summer feeding grounds. With increasing competition for the same resource, the Sperm Whale (*Physeter macrocephalus*) was identified as a profitable quarry, and became the object of targeted hunting by about 1720 (Mawer 1999). The quest for sperm whale necessitated the use of larger, better fitted and provisioned sea going vessels able to pursue the sperm whale into deep waters. The added expense, time and danger involved in chasing the sperm whale was offset by the high value of its two exclusive products; spermaceti oil from the large head cavity, which produced superior candles that burned with a very bright clear flame, and ambergris, a type of fatty secretion found in the intestines which was highly prized for use in perfumes and cosmetics (Mawer 1999; Whipple 1979). Initially whaling ships would head south into the Atlantic in pursuit of sperm whales in spring, and then return north to catch the migrating right whales in summer, enabling ships and crews to be employed for much of the year. However increasing competition and various political and economic forces eventually prompted American whalers to push further and further south along the Atlantic coasts of the Americas and Africa, exclusively in search of sperm whales (Mawer 1999).

By the 1780s, both American and British ships plying the Atlantic found sperm whales to be increasingly scarce, prompting the first forays around Cape Horn and the Cape of Good Hope into the Pacific and Indian oceans. In 1786, the *Triumph* ventured as far as

55 degrees south and some distance east of the Cape of Good Hope, returning with a considerable cargo of sperm oil from a voyage cut significantly short due to ship damage (Mawer 1999). Subsequently, two of the ships contracted to transport convicts in the First Fleet carried licences ‘to fish’, and upon disembarking their convict cargos in 1788, each left to pursue their ‘fishing’ interests. The *Prince of Wales* headed for the Peruvian coast in pursuit of sperm whale, but had to abandon the hunt due to illness (Mawer 1999). Concurrent with this, the first whale ship to round the Horn into the Pacific, the British *Emilia*, encountered such an abundance of sperm whales along the west coast of South America as to be scarce believed and when they eventually left for the return voyage in September 1789, every cask was full of whale oil (Mawer 1999; Whipple 1979). The *Emilia*’s success prompted a hasty scramble by the Americans and British alike and during 1790 or 1791, one ship the *Rebecca*, encountered no less than 39 other whalers in the Pacific by the end of her voyage (Whipple 1979).

By the time of the Third Fleet’s departure in 1791, five whalers were part of the transport convoy, all of whom had a view to heading for the South American grounds after discharging their cargos. However, half a days sail out of Sydney, the *Britannia* came upon vast ‘shoals’ of sperm whales, and after arrival at Sydney made all haste to unload and depart to take advantage of the unexpected bounty before any of its competitors (Gojak 1998; Mawer 1999). With the *William & Ann* hot on its heels, the *Britannia* relocated its quarry and killed seven whales but only secured three due to bad weather. The poor weather continued and despite sighting many whales every day for a week, none of the five whalers could secure any more (Mawer 1999). All the whalers sailed on to the Peruvian coast in dismay, with the exception of the *Britannia*, whose captain resolved to stay on for a month to allow the weather to clear. The hoped for improvement did not come in due time, so the *Britannia* also quit Sydney for South America much to Governor Phillip’s bitter disappointment, as he had great hopes of establishing some form of economic venture for the fledgling colony (Anon 1892; Gojak 1998; Mawer 1999).

Despite this inauspicious beginning to whaling in Australian waters, events conspired to make it an increasingly attractive option to the coasts of South America and Africa with the outbreak of the French revolutionary wars in 1793. The growing difficulty in being able to whale unmolested off Spanish held coasts, find neutral ports of refreshment and the general risk of being captured by enemy military ships and privateers made the western Pacific an increasingly desirable destination (Dallas 1969; Mawer 1999). Further

opportunities to carry out cargos of convicts encouraged more British whalers into New South Wales' waters:

“...we will carry them on as low terms as anyone, and we then shall have an opportunity of giving the Fishery on the Coast of New South Wales a fair trial as we are very sanguine of Success, and if they do not succeed they can get sufficiently refresh'd to make a trip to the Coast of Peru without going into Port and return to refresh before they sail for England” (Enderby 1796 in Mawer 1999:88).

By 1800, the Tasman Sea or the ‘Middle Grounds’ as it came to be known was starting to show promise:

“...in coming from Norfolk [Island] I got 4 Whales...and now as the Summer is coming on I have no doubt of getting Oil fast at Norfolk...I think that from the 1st Sept to the last of May there is moderate Weather on this Coast with only fresh Blows now and then and during that time I think there is a great deal of Oil to be got, if not a full cargo with persevering...that there is a Fishery on this Coast I have no doubt from what I have seen and mean to prove it if possible by Example” (Quested 1800 in Mawer 1999:89-90).

Within a couple of years the Tasman Sea was established as a new hunting ground, with both British and American whalers hunting sperm and southern right whale (*Eubalaena australis*) in the southern Australian and New Zealand waters on a regular basis. Sealers also operated in Bass Strait and around southern New Zealand and occasionally whalers engaged in opportunistic sealing, particularly when ports such as Sydney, Norfolk Island and later Hobart were close at hand to enable trade of the skins and whale products for supplies or immediate profit (Greenwood 1943; Mawer 1999; Whipple 1979). Eventually, Phillip’s earlier ambition for the colonies’ economic future had been realised:

“By the 1820s, exports of whale oil and whalebone were paying for much of the iron, cloth, tools, salt provisions, tea, rum and Far Eastern luxury goods that came into the colony. The rest was bought with profits from sealing” (Hughes 1987:332).

Thus, by this time Hobart had become the primary port in southern waters for whalers (and sealers), as not only did it provide “...a great station for the refitting of whaling ships of foreign nationalities”(Anon 1924 in Greenwood 1943:134), it was the home port for a great number of Australian owned whaling vessels as well as servicing a number of Tasmanian shore based whaling operations (Hughes 1987). Sydney also had a significant role, and in the late 1820s had five whaling vessels based there, as well as providing all the usual services of the largest port for thousands of kilometres (Gojak

1998). Furthermore, New Zealand was becoming an increasingly productive area as its coasts swarmed with seals, sperm and right whale and prior to the Treaty of Waitangi in 1840, provisions were abundantly and cheaply available in trade with Maori groups without restrictions and duties at port (Grady 1986).

The growth of whaling in the western Pacific and particularly the middle grounds prompted the need for more places of refreshment in both New Zealand and Australia, and as a consequence vessels visited LHI once more, again making the island part of the communal larder for maritime activity in the Tasman Sea. Records of early visits by whalers and other ships prior to settlement are scarce, but whalers were certainly calling at LHI for water, firewood, hunting and gathering by the 1820s, and were frequenting the island often enough to prompt some to release goats and pigs on the island to ensure a regular supply of large game (Nichols 2006; Rabone 1940). Undoubtedly the visiting ships crews would have found a similar plenitude of birds, fish and possibly ‘coconuts’ that the First Fleet visitors had previously enjoyed, as well as locating reliable sources of water and wood. The abundance of these resources was not inexhaustible however, as it appears that the largest and most easily caught land bird described by the First Fleeters, the flightless White Gallinule, was extinct or very close to it at permanent settlement in 1834 (Hutton 1990). Similarly, if the mysterious ‘coconuts’ and Tasman Boobies did occur on LHI in 1788 these also seem to have been completely wiped out by human activity (including the effects of introduced mammals), prior to settlement.

The impact of periodic stays by shipwreck survivors and possibly convalescent sailors suffering from scurvy is unknown, but should not be discounted. The only confirmed record of shipwreck survivors on LHI prior to settlement was that of the *George* which was wrecked off the southern end of the island on George rock in December 1830. Upon having beached their sinking vessel in one of the bays in the south-eastern cliffs, the entire crew remained in the bay until February 1831 when the captain and four of the crew were rescued; the remainder were picked up in March 1831 (Nicholls 1952). A stay of at least eight weeks by approximately 30 men is likely to have made some impact on LHI, but as their landing place would have been immediately bounded by the steep cliffs of Mount Gower’s southern slopes, their impact was most likely restricted to the bay’s marine resources such as fish, shellfish and seabirds. Consequent to LHI’s new role as a convenient source of water, wood and wild provisions, it would not remain uninhabited for

long as it would soon become part of the growing economic network of south sea whaling in a much more tangible way.

As the south sea whaling and sealing flourished, so too did the local colonial merchants who had taken early risks to invest in the industry. Notable players in the early colonial whaling and sealing trade included Simeon Lord, James Underwood, and Robert Campbell, the latter being credited with beginning the Australian sperm fishery by purchasing the *Elizabeth* and sending her to the New Zealand grounds (Hughes 1987; Mawer 1999). Local merchant interests in Australia and New Zealand not only included the running of deep-water vessels and shore-based stations but also the establishment or patronage of port settlements to enable the reliable provisioning of ships and more remote stations. These settlements were especially important to the New Zealand fishery, providing not only supplies but a means of participating in the trade of other valuable New Zealand produce such as flax and timber (Mackay 1992; McNab 1913; Rice 1992). As the local fishery and flax and timber trade flourished, more and more coastal settlements sprung up, and the informal colonisation of New Zealand was well underway. The most important and frequented area for whalers was the Bay of Islands, and the settlement of Kororareka, where water, wood, pork, fish, vegetables, chandlery, ship refits and the all important sex and alcohol could be procured (Grady 1986). Other ports frequented by whalers included Mangonui, Auckland, Whangaroa, Port Underwood, Akaroa, Lyttelton, Otago Harbour, Port William and the offshore Chatham Islands (Grady 1986). Many of these communities comprised a mix of traders and agents, missionaries, shore whalers, escaped convicts, ex whalers, assorted opportunists and local Maori and generally flourished during the peak New Zealand whaling period of the 1830s (Grady 1986).

The success of these communities and trade with Maori groups did not always foster peaceful harmony during this time. One of the prime commodities sought by the Maori were muskets, and the subsequent escalation of inter-tribal warfare saw some communities under siege, slaughtered or driven out between 1818 and 1833 (McNab 1913; Rice 1992). During the latter years of these inter-tribal conflicts, the negative effects were so great that both the European settlers and Maori tribes petitioned the British government for intervention. In the meantime many settlers and merchant companies either completely quit certain places or scaled back their investment in New Zealand in the face of continuing violence and uncertainty (McNab 1913; Rice 1992). In March 1834, Cloudy Bay whaling stations were attacked by Maori from the Otago area, and stations belonging to Robert

Campbell and Captain Blinkensoppe of the *Caroline* in particular were destroyed and the majority of their workers taken prisoner, with only two white men and some native women escaping in a whale boat (McNab 1913). Whether the stations were repaired and remanned is not clear, nor is the exact business partnership between Blinkensoppe and Campbell, but there was clearly some sort of arrangement for a period. The *Caroline* left Cloudy Bay on the 3rd June 1834, with a cargo of right and sperm whale oil from Campbell's station for Sydney, but it did not reach its destination until the 5th July (McNab 1913). The *Caroline* must have also had passengers onboard, as sometime in June, Blinkensoppe landed a party in the employ of Robert Campbell and Co on LHI with the express purpose of establishing a supply station for the whaling trade (Nichols 2006; Rabone 1940).

The party comprised of three British whalers, George Ashdown, James Bishop and Mr Chapman, each accompanied by a Maori wife, at least one child and probably one Maori youth, and it is quite likely that some, if not all of the party had previously been employed at the Cloudy Bay establishments by Campbell and/or Blinkensoppe (Nichols 2006; Rabone 1940). George Ashdown at least, had previously been working as a trader and shore whaler at a station at the 'Sugar Loaves' in Taranaki, and in February 1832 was among a handful of traders who along with the remnant of the Ngati-Awa Maori were besieged for three weeks by a neighbouring tribe (McNab 1913). No doubt Robert Campbell and Co were interested in establishing a more secure station of refreshment for their whaling ships and Ashdown, Bishop and Chapman had seen enough war for a while and chose to continue their employment in a hopefully more peaceful setting, and thus LHI was permanently settled.

First Settlers

Upon arriving at LHI in June 1834, popular island history has Blinkensoppe landing the party at Blinkenthorpe Beach (which now bears his name under a different spelling), but due to the hazardous conditions that usually prevail there this has been disputed (Finch and Finch 1967; Nichols 2006). Regardless of the landing site, the party soon made their way to Hunter Bay, where they built a group of five huts either side of a fresh water creek at the northern end of the bay (White 1835). The settlers were quick to establish gardens on the island, not only to provision themselves, but to enable the commencement of the trade they had been sent to undertake. The first area tried for cultivation is not known but it was found to be too stony and another garden was established in the area behind the large dune

at Blinkenthorpe Beach (White 1835). It is not clear how soon they were able to supply vegetables to ships, but the first vessel recorded coming to LHI after settlement is the *Adelaide*, which arrived in October 1834 and landed an escaped convict from Tasmania and a couple of crew members (Nicholls 1952; Rabone 1940). Upon the incident being reported in Sydney, the colonial authorities despatched the *Prince George* to LHI to pick up the convict and crew and return them to Sydney. Aboard the *Prince George* was also H.J. White, Assistant Surveyor from the Surveyor-Generals office to assess LHI's suitability for a penal settlement and conduct a preliminary survey of the island (Nichols 2006; Nicholls 1952; Rabone 1940). White's testimony that the island lacked suitable anchorage, sufficient fresh water and that the soil was unsuitable for wheat meant that the penal colony idea was shelved for a time. More importantly his report and map (see Figure 3.1), though brief and suffering significant cartographic errors is only one of two detailed records of the island settlement during the Ashdown, Bishop and Chapman's occupation and provides valuable information on the people of the settlement and their subsistence approximately six months after their arrival:

“There is a small patch of ground on the east side of the Island which has been cultivated as a garden, containing potatoes, carrots, maize, pumpkins, and tarra, all of which seem to thrive well. Another piece of ground more to the north was also tried as a garden, but was found to be too stony. There are residing on the Island four men, three New Zealand women, and two children, subsisting upon birds and fish, which are caught in great abundance” (White 1835:4).

No mention is made of trade activities undertaken by the settlers, nor of any use of the feral goats and pigs already inhabiting the island and it may be that the settlement was not established enough for such undertakings. The composition of the population is also a bit mysterious and sources conflict slightly on who exactly accompanied the three couples to LHI; either two children or two Maori 'boys' which might refer to grown men or children (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). White's mention of a fourth man as well as two children make it more likely that one of the 'boys' originally landed was probably a Maori youth and the other a child of one the couples, the second child being born after their arrival on LHI.

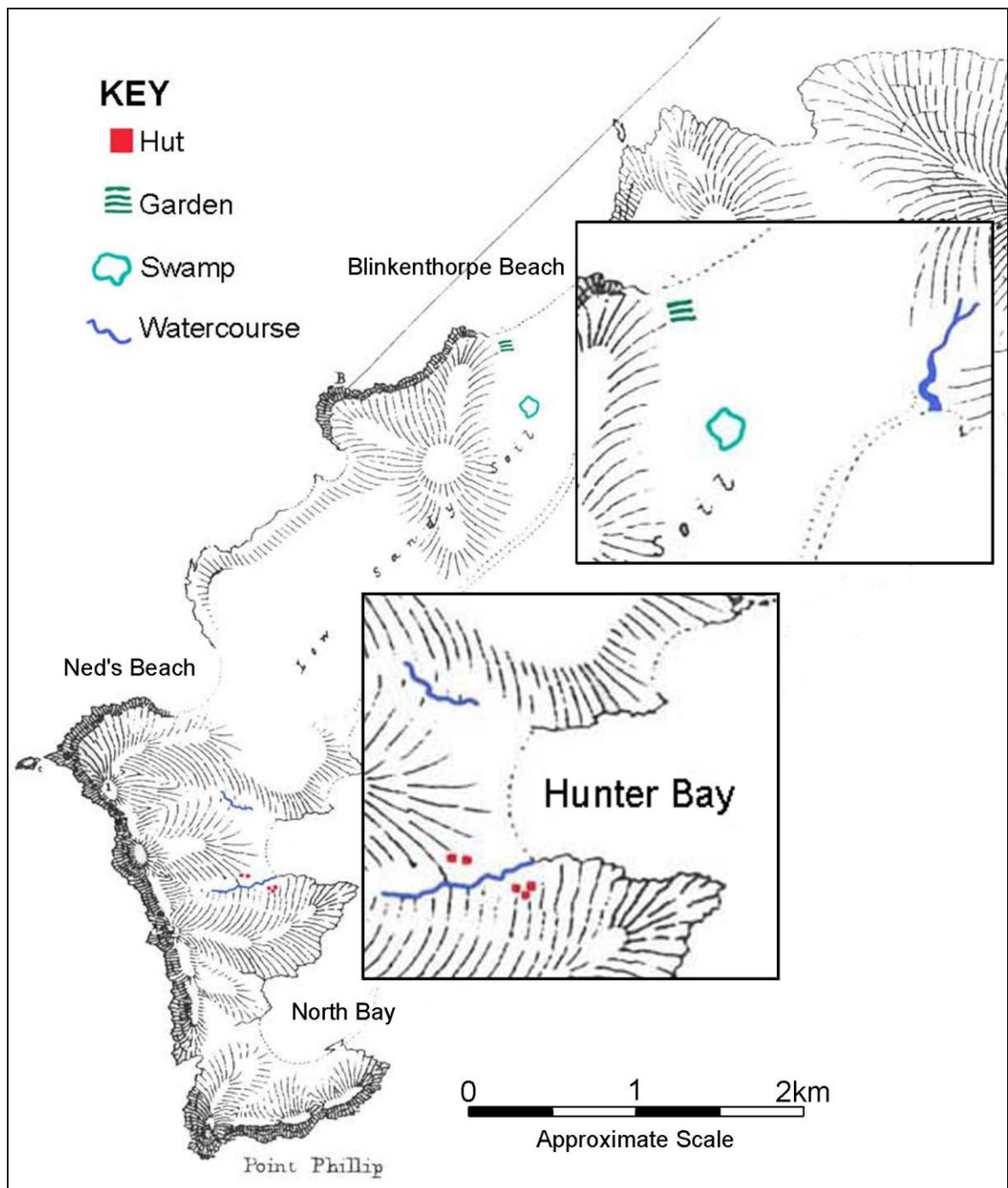


Figure 3.1: After White's 1835 map, showing Ashdown Bishop and Chapman's huts in Hunter Bay and their garden behind the Blinkenthorpe Beach dune.

This is supported by the account of an unknown visitor to the island some time between 1834 and 1841:

“There were three white men (English) on the island, and each of them had a wife and a numerous family; their wives were New Zealand women, which they had picked up, somehow or other, from ships putting in for food. Those three Robinson Crusoes, a big lad, brother to one of the women, and their families, constituted the whole of the population” (Anon 1849: no pagination).

The anonymous traveller also loosely confirms the location of the settlement in Hunter Bay, mentions the crops observed by White plus additional produce and livestock, verifies the eventual provisioning trade with ships and the hunting of feral goat and pigs and illuminates the general quality of living of the island:

“They had plenty of pigs, goats, poultry, and dogs for hunting; besides a canoe for catching fish, so they did not want any provisions, whatsoever may have been their other privations. There we saw growing pumpkin, the watermelon, potatoes, onions, cabbages, and other vegetables, all of which were cultivated with care, and appeared in a healthy condition. There was a beautiful bay of smooth water within the reef, with a sandy beach, which leads up to the bottom of a hill, where these island-triumviri had built their houses, which were rude and simple in structure, but by no means incommodious; and these secluded adventurers and their families, lived happily together, so at least I should infer from their appearance, and their observations” (Anon 1849: no pagination).

Despite the isolated and ‘rude and simple’ lifestyle of the first settlers, their standard of living was probably as ‘happy’ and more sustaining than of many their contemporaries at other trade stations. It seems likely that a good number of children were not only born to the first settlers but survived and even flourished during the first years of settlement. Later baptism records of George and Emma (Raukatauri) Ashdown’s children at the Manning street Methodist Church in Wellington show that that they had four children born on LHI; Helena 14/10/1836, David 5/5/1838, Sarah Louise 17/7/1839 and Mareae 17/12/1840 (Nichols 2006). Any children born to Bishop and Chapman are unknown, but it is not unreasonable to expect each couple to have had at least two children, particularly as the unknown visitor refers to the each man having a ‘numerous family’ (Anon 1849).

The primary occupation of the group was the victualling of whale ships, which involved the supply of vegetables, water, firewood, pork, goat, and possibly fish and domestic and/or native birds, traded in exchange for staples such as flour, tea, sugar, tobacco, alcohol, clothing and soap. Attempts at establishing a secondary economic venture from the island were made with the export of mutton-bird feathers to Sydney for bedding and furniture stuffing but these efforts were eventually abandoned owing to the difficulty in selling the feathers due to their odour (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). Another service the first islanders periodically performed involved the nursing of scurvy afflicted sailors or offering resort to shipwreck survivors. In 1840 the *Genii* landed most of its crew with scurvy on the island and in November that year the *William Hamilton* lost its cooper, Charles M. Brooks, to the disease while offshore at

LHI (Nichols 2006; Rabone 1940). His burial in Hunter Bay is the oldest recorded on the island but other anonymous burials from passing ships occurred as several instances of washed and eroded out graves in dunes and creeks around the island show. In 1837 the *Wolf* was at LHI to obtain water and fresh provisions for its scurvy affected crew, when the ship struck Wolf rock on the eastern side of the island (Finch and Finch 1967; Nicholls 1952; Rabone 1940). All the crew made it to shore and remained for five weeks until they were picked up by the *Psyche* and taken to Sydney where the Captain of the *Wolf* reported upon their time at LHI:

“We were all treated with the greatest kindness by the few individuals on the island, sharing their last pound of flour with the shipwrecked men; after which, they were necessitated to subsist entirely upon the produce of the island” (Anon 1837 in Rabone 1940).

In general it seems that the Ashdown, Bishop and Chapman families conducted a successful, if low-key trading venture on the island and managed to maintain an adequate or even comfortable living from both their subsistence on local resources and their husbandry of introduced produce and livestock. The first settlers continued their provisioning trade until September 1841, when the *Jane Eliza* arrived carrying Owen Poole, who as the representative of his business partnership with Richard Dawson, purchased Ashdown, Bishop and Chapman’s improvements and interests in the island supply trade. Poole bought the settlers out for the combined sum of £350, £100 per family, plus an additional £50 to the Ashdowns for their more substantial improvements (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). Why the first settlers were free to sell the provisioning business, which had been purportedly established at the direction of and with capital from Robert Campbell and Co is not known. It is possible that the original arrangement was only for a set period after which the group were free from all obligation to the company, the families may have at some time purchased the ‘interests’ and continued independently, or from the outset the venture was an equal or total investment on the part of each family, and Robert Campbell and Co merely provided transport and some guaranteed trade. Regardless, it seems that each group was then free to go their own way – the Ashdowns left almost immediately, as the family were in Wellington by 14th November 1841 to have their children baptised (Nichols 2006). When the Chapmans left is not clear, but it was likely to be soon after Poole’s arrival as there is no further mention of them on the island, and what their eventual destination was is not known. The Bishops appear to

have stayed on for at least another two years, as the shipping records that James Bishop kept on the island and periodically sent to the Sydney paper *Monitor* continued, with the last submitted under his name containing information for all 1843 (Nicholls 1952).

Second Wave Settlement

Poole and Dawson were not idle in promoting their newly acquired provisioning trade on LHI, and an advertisement appeared in the *Sydney Herald* on the 13th September 1841:

“Notice is hereby given that a station and store is formed at Lord Howe’s Island in Latitude 31 30’ South, and Longitude 158 East, where whaling and other vessels can be provided with live stock, Fish, Potatoes and other Vegetables, Slops, etc., on moderated terms. Vessels approaching the Island can be communicated with by a Boast [sic], which is kept for the purpose of conveying supplies, consequently Masters will not find it requisite to for [sic] any of their men to leave the ship. The Settlement is on the West side of the Island” (Anon 1841 in Rabone 1940:26).

The timing of this advertisement also makes it more likely that there was some sort of temporary arrangement for all or some of the first settler families to continue the island trade while Poole and Dawson arranged for more workers. At some point in 1841 during this changeover period, a completely independent couple came to the island and settled in Callam Bay, later known as North Bay (Nicholls 1952; Rabone 1940). Captain Middleton and his wife Eliza farmed and raised pigs in the vicinity of the present day North Bay picnic area, and seem to have been completely independent of Poole and Dawson’s enterprise, but are likely to have engaged in some trade of their own with Poole or directly with ships to ensure their own supply of necessities that the island could not produce (Nichols 2006). Similarly another man who arrived on LHI in the same year, Charles Williams, settled independently on the island on the lowlands to the east-south-east of Signal point, and probably participated marginally in the Poole run provisioning business (Nichols 2006; Nicholls 1952). By late 1841 or early 1842 Poole had brought out three families, the Hescotts, McAuliffes and Wrights to continue farming and trading on the island under his supervision, and it is likely that they took up immediate residence at Hunter Bay in the dwellings purchased from the first settlers (Finch and Finch 1967; Rabone 1940). No doubt the new settlers maintained the established gardens, but the exact location of these is unknown. There was likely to be some gardening undertaken in Hunter Bay, and it possibly continued at the site near Blinkenthorpe Beach recorded by White.

The new workers and Poole carried on the provisioning trade successfully as ships continued to call, and by mid 1842 it seems that it was necessary of Poole and Dawson to hire more workers to maintain the operation. Thomas and Margaret Andrews arrived on the *Rover's Bride* in July 1842 on a 12 month contract, and probably resided in Hunter Bay with Poole and the other families (Nichols 2006; Rabone 1940). It is possible that around this time, farming efforts were significantly expanded, as at some point before 1845 the Wright family moved to the very southern end of the island lowlands and farmed in the area of the only significant water basin on the island, known then as Big Creek (Nichols 2006; Rabone 1940). Many individuals ended up at LHI by chance or design and were often deserters or convalescent sailors from whaling and trade ships, shipwreck survivors who stayed on or discovered stow-aways put ashore. Such was the case with Johanna Moran, who had been smuggled aboard the *Jane* by her sweetheart Alan Moseley, but was discovered by the Captain and put ashore at LHI. Alan served out his term on the ship and returned to the island, where he and Johanna were married by Captain Poole and found employment in the provisioning business. Where the Moseley's resided upon arrival is not clear, but it is possible that they dwelt for a time in Hunter Bay, before joining the Wrights at Big Creek (Nichols 2006; Rabone 1940). Another chance arrival was a deserter from a whaler, called Moss, who arrived in 1843 and after refusing to work for his keep was detained by Poole, escaped, and threatened great mischief to the settlement before being captured again and eventually shipped to Sydney (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940).

The victualling trade continued to be successful enough to entice a third investor to join the partnership and take up residence on the island. Poole sold half of his share to Dr James Foulis in 1844, and in August that year Foulis came out on the *Wave* with his wife, daughter, four single men, Mr and Mrs Andrews who had been rehired for a second contract and 30 'packages' of household goods (Finch and Finch 1967; Nichols 2006; Rabone 1940). Foulis and his family built a residence near Windy Point, which was known as the Homestead and the Andrews were employed as servants for the household and lived nearby (McFadyen 1992; Rabone 1940). The four single men, John Slade, Thomas Varney, George Thom and Thomas Platter were employed as labourers for £10 a year and a single ration, but where they resided and whether they laboured in the established gardens or worked to create new ones in the vicinity of the homestead is not clear (Finch and Finch 1967; Nichols 2006; Rabone 1940). What also is not known is the presence of the Hescott

and McAuliffe families at this time, as there is an equal possibility that they remained working for the Poole-Dawson-Foulis partnership or that they had left, particularly if they had had fixed term employment contracts as the Andrews did.

The successive importing and opportunistic on-island hiring of workers and renewed capital investment for the provisioning business on LHI make it apparent that the trade continued to grow and could sustain a number of people comfortably for some years. Dr Foulis writing retrospectively of his time on LHI, provides the only comprehensive first hand account of life on the island at this time and gives details on numerous aspects of life on the island, and in particular the success of farming and trade (Foulis 1851):

“Howe’s Island has for many years been a place of resort for whalers to procure wood, water, and fresh provisions, to enable them to prosecute their voyage without the necessity of going into Port. There were generally from 60 to 80 vessels in the course of the year that touched there for the above purpose, and it not unfrequently happened that we had English news from American vessels some weeks before the same was known in this Colony” (7).

“All kinds of vegetable can be produced in great abundance, potatoes, pumpkins, and other garden provisions are reared twice a year and sometime oftener from the same ground...Maize and wheat grow well and have yielded large crops as also the sweet potatoe[sic], which seems very well adopted for the more sandy parts...The banana grows luxuriantly and ripens very well; and some vines which I planted on my arrival on the Island flourished exceedingly well and were producing fruit before I left” (5).

“The mutton bird, (which serves as an article of food, and is much esteemed by the inhabitants) visits the island at certain seasons in flocks of thousands to lay its eggs in the ground, at which time it is caught in great numbers for the sake of its feathers. It is only the young unfledged birds that are eaten, as they are free from any fishy rankness” (6).

“With respect to water, I am of opinion that any quantity could be obtained by sinking wells or forming dams. There are many good springs on the hills, and I caused one or two wells to be sunk at a very moderate expense...They were about 15 feet deep, and contained about 10 feet water and never failed in the driest weather in supplying the settlement with abundance of pure and wholesome water” (5).

The birth and survival of at least four children from 1841 to 1846, to three different families further illustrates the successful and comfortable nature of the islanders farming and gathering efforts; the Wrights had two daughters, Anne in 1842 and Jane in 1844, the Foulis one son in 1845 and the Andrews one daughter Mary in 1846 (Edgecombe 1987;

Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). A further indication of the increasing success of the island trade comes from the apparent growing autonomy of some of the working families, as the Wrights, Moseleys and Andrews formed their own farming partnership in 1846, working gardens at the southern end at Big Creek independent from the Poole-Dawson-Foulis interests (Kelly 1984; McFadyen 1992; Nichols 2006). The two partnerships continued successfully, until 1847 when Poole, Dawson and Foulis petitioned the New South Wales government for leasehold on the island, but were unsuccessful in their request. The colonial government was still considering the future use of the island as a penal colony and was not prepared to grant any titles on LHI, and having failed to attain this long-term security for their investment Poole, Dawson and Foulis decided to dissolve their partnership and abandon their interests on the island (Finch and Finch 1967; Nicholls 1952; Rabone 1940). Foulis traded his 'Homestead' and surrounding land with Captain Pierce of the *General Pike* for his family's passage back to Sydney, and left LHI on 9th August 1847 (Kelly 1984; Nichols 2006). Poole and Dawson seem to have abandoned their interests wholesale, while giving their employees the option to stay on and work the improvements independently (Finch and Finch 1967; Nichols 2006; Rabone 1940). Of the partnership's previous employees, only the Wrights, Moseleys and Andrews chose to stay, and upon leaving in 1847 Poole possibly 'transferred' the improvements at Hunter Bay to the Andrews (McFadyen 1992; Nichols 2006).

Thus the Wrights, Moseleys and Andrews continued farming at Big Creek, while the Middletons and Charles Williams stayed on at their respective locations. The Big Creek farming partnership endured until 1848, when Captain Pierce of the *General Pike* returned and traded the 'Homestead' for two tonnes of potatoes with the Andrews, who then dissolved their partnership on mutual terms and moved to the old Foulis property (McFadyen 1992; Nichols 2006). The Wrights remained where they were, and the Moseleys moved further north to settle the area from behind the Blinkenthorpe Beach dune along the foot of Lookout or Transit Hill (Nichols 2006; Rabone 1940). These remaining settlers carried on the provisioning trade in much the same way, and even though the parties were 'independent' from each other, the trade that came was shared around the island's inhabitants, and this practice of community co-operation continued as successive groups came to the island to settle from the early 1850s onwards.

Growing Settlement and Whaling Decline

From the 1850s the island population grew slowly but steadily with new individuals and families coming to settle every couple of years. The question of LHI being a possible location for a penal colony was raised again during this time and having already commissioned Foulis' report and map of the island in 1851 (see Figure 3.2), the colonial secretary asked Captain Henry Denham of the HMS *Herald* to submit copies of any surveys he had done of the island while there with the *Torch* from April to June in 1853 (David 1995; Denham 1853; Foulis 1851). Denham was also asked to supply any information relevant to the possible prospects of the island being suitable as a penal colony (David 1995; Nicholls 1952; Rabone 1940). Denham responded with a detailed map of the island and its surrounding waters (see Figure 3.3) and a comprehensive report, in which he stated that the island would be an appropriate location for a small penal colony, and suggested that convicts could conduct a profitable export of produce, fish, and timber from the island (Denham 1853). Denham also wrote of the current settlers and praised their industry and situation:

“It appears then, that... Andrews, Mosely, and Wright have...cultivated with most commendable industry the several plots of cleared land which are delineated in outline upon the Chart of the Island which accompanies this report. These people who, with their serving men, wives, and children, comprise a little community of sixteen persons, not only derive a comfortable subsistence but store up the overplus of their crops for whalers and other vessels who may accidentally or intentionally approach the Island and require refreshments. The supplies in question are of a sort very much to be desired by a whaler or a chance passenger vessel driven to the northward and eastward out of her path to Sydney, and consist of pigs, poultry, potatoes, and every variety of fruit and vegetables, not omitting that indigenous esculent the palm cabbage nor the fish which abound” (Denham 1853:12).

The 16 persons that Denham found upon the island not only included the named families, which accounted for nine individuals. The settlement had been joined by four single men; William Bliss, William Gibson, William Brown and William Cruze who along with the Middletons and Charles Williams made the 16 recorded by Denham (Denham 1853; Nichols 2006; Nicholls 1952; Rabone 1940). Bliss and Gibson appear to have established and worked their own houses and gardens; Bliss at an unknown location and Gibson to the south of Windy Point adjacent to the Moseleys (Nichols 2006; Nicholls 1952; Rabone 1940). It is possible that they also ‘served’ as Denham put it, at one or more of the more established farms, as indeed Charles Williams may have done. Brown and Cruze

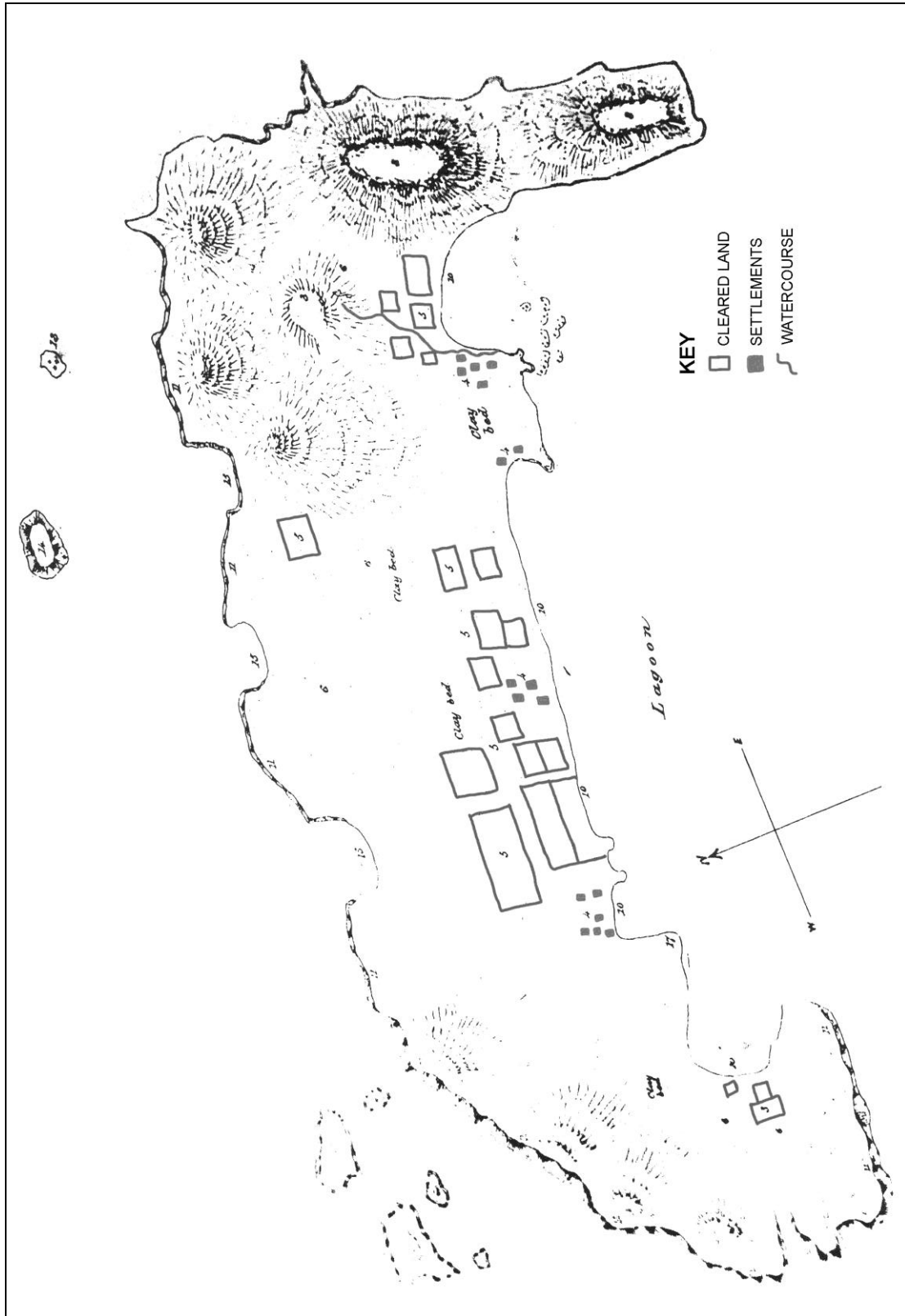


Figure 3.2: After Foulis' 1851 memory map of cleared land and 'settlements' on LHI, including the source of permanent water at Big Creek

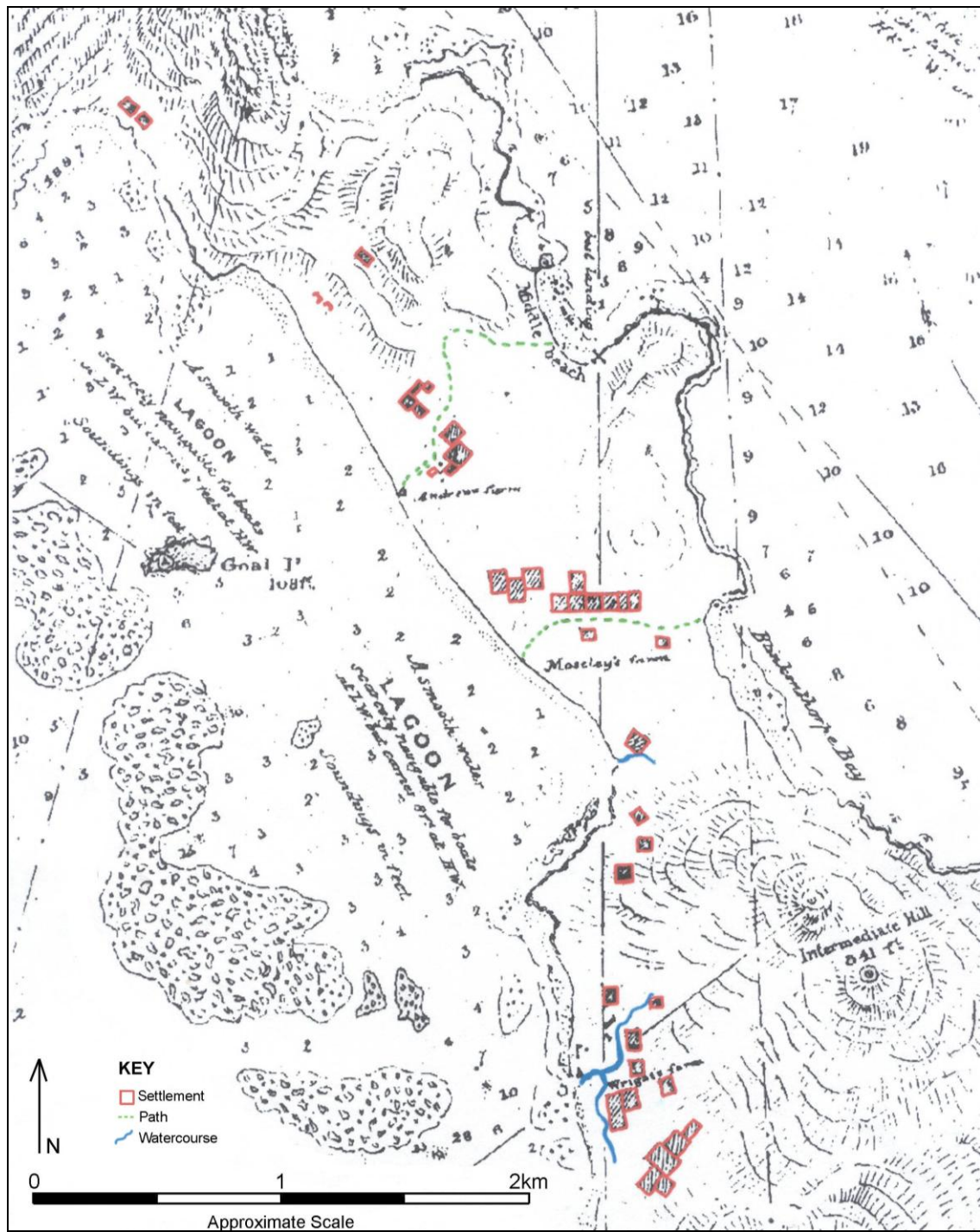


Figure 3.3: After Denham’s 1853 map showing Andrew’s, Mosley’s and Wright’s farms, the major water sources (including Big Creek) and several unlabeled settlement areas.

appear to have been working and living on the Andrews holding, and continued to do so until Brown’s disappearance and death in the mid 1850s and Cruze’s departure in the 1870s (Nicholls 1952; Rabone 1940).

The penal colony issue was debated some more following Denham’s report, but it was again temporarily shelved and the LHI settlers were left to continue as they were, but

still without the benefit of leasehold. The established provisioning trade persisted and the steady stream of settlers continued, being both families and individuals via the colonies or opportunistic arrivals from whale and trading ships. As the settlement grew in numbers and spatially, a greater variety of crops were trialled, and most succeeded in the fertile soil. From the very beginning crops grown on the island rapidly increased in variety and have included: maize, wheat, sorghum, potato, sweet potato, yam, taro, arrowroot, onion, carrot, pumpkin, cabbage, melon, papaw, fig, orange, lemon, lime, banana, plantain, guava, peach, passionfruit, cape gooseberry, grape, sugar cane, ginger, coffee and castor oil (for a full list see Figure 3.4: Anon 1849; Clarson 1882; Denham 1853; Foulis 1851; Hill 1869; Macdonald 1853; White 1835). Livestock and feral introductions were a little more staggered with goat and pig being present at first settlement and dogs and most domestic fowl (chickens, ducks, geese and possibly turkey) brought to the island soon after (Anon 1849; White 1835). A passing whaler introduced three cats around 1846-47, rabbits were on Blackburn Island by 1853 and mice were accidentally introduced via incoming cargo between 1867 and 1868 (Finch and Finch 1967; Hill 1869; Hindwood 1940; Macdonald 1853). Larger livestock appear to have been introduced later, presumably once sufficient grazing land had been cleared, with cattle and horses being introduced between 1866 and 1869 (see also Figure 3.5: Finch and Finch 1967; Hill 1869; Rankin 1896; T.D.E. 1893). One primary source refers to ‘horned cattle’ being present on the island in 1853, which may indicate that cattle were trialled previously and perhaps did not succeed due to a lack of sufficient grazing (Macdonald 1853).

As the island’s agricultural capabilities improved, the demand for produce slowed as the boom years of whaling inevitably started a slow decline from the introduction of petroleum products in 1856, and the outbreak of the American Civil War in 1860 (Mawer 1999; Nichols 2006). The effects were not immediately felt on LHI, as its peak years for provisioning whalers were still to come due to other influences. In the wake of the Australian gold rushes (from 1851) ships captains were reluctant to land at mainland ports for fear of losing significant numbers of their crew to the lure of a quick and vast fortune on the goldfields and alternative ports of refreshment were more highly sought (Finch and Finch 1967; Nichols 2006; Nicholls 1952). Lord Howe Island’s peak years of 1856-1857 saw an average of one ship a week and up to 8 vessels standing on and off outside the reef at one time, and shipping continued at a significant if slowly declining rate well into the 1860s (Nichols 2006; Nicholls 1952). One source draws from the log of a whaling ship

Grain	Year	Fruit	Year	Vegetable	Year	Other	Year
maize	1835	watermelon	pre 1841	carrot	1835	castor oil	1853
wheat	1851	banana	1851	potato	1835	mint	1853
sorghum	1880	grape	1851	pumpkin	1835	coffee	1869
lucerne	1898	cape gooseberry	1853	taro	1835	tobacco	1876
teosinte	1898	marsh melon	1853	cabbage	1851	sugar	1880
		melon	1853	onion	1851	ginger	1882
		lemon	1869	sweet potato	1851	liquorice	1882
		orange	1869	eggplant	1853	birds eye pepper	1898
		passionfruit	1869	arrowroot	1869	blue aloe	1898
		pawpaw	1869	yam	1880	candle nut	1898
		peach	1869	choco	1898	chilli	1898
		plantain	1869			peanut	1898
		strawberry	1869				
		yellow guava	1869				
		pomegranate	1876				
		Brazilian cherry	1882				
		cucumber	1882				
		custard apple	1882				
		fig	1882				
		granadilla	1882				
		kei apple	1882				
		longan	1882				
		loquat	1882				
		lychee	1882				
		mandarin	1882				
		mango	1882				
		mulberry	1882				
		nectarine	1882				
		olive	1882				
		pineapple	1882				
		tomato	1882				
		wampee	1882				
		apple	1898				
		apricot	1898				
		black guava	1898				
		citron	1898				
		cherimoya	1898				
		date	1898				
		lime	1898				
		pear	1898				
		plum	1898				
		quince	1898				

Figure 3.4: Table showing the first year that primary sources mention crops and economic animals being present on Lord Howe Island.

Animal	Date Intro	Circumstances of Introduction	Economic Use
Bee	about 1878	Introduced by Armstrong	Honey, possibly wax
Cat	about 1845	Released by a visiting whaler	None stated - possibly as a companion
Chicken	1834?	Likely intro by Ashdown, Bishop and Chapman	Flesh, eggs
Cow	1867-1869	Introduced by Wainwright	Draught, dairy
Dog	1834?	Likely intro by Ashdown, Bishop and Chapman	Hunting, possibly as a companion
Duck	1834-1869	Unknown - possible intro by Ashdown, Bishop and Chapman	Flesh, eggs
Goat	1788-1833	Released by a visiting whaler	Flesh, skin, possibly dairy
Horse	1866-1869	Introduced by Thompson	Draught animal
Mouse	1867-1868	Colonised from a Norfolk Island ship	None - minor insect control
Owl	1922-1930	Introduced to control rats	Rat control
Pig	1788-1833	Released by visiting whalers	Flesh
Pigeon	1834-1869	Unknown	None stated
Rabbit	1834-1869	Unknown	None stated
Rat	14/01/1918	Jettison from SS <i>Makambo</i> aground	None
Sheep	1877-1893	Unknown	None stated - likely flesh
Turkey	1834-1869	Unknown	Flesh

Figure 3.5: Table showing the dates of introduction of major economic and feral animals and birds on LHI

that visited LHI during this peak time, and illustrates the varied nature of trade and facilities on the island:

“...the unmistakable signs of trading appeared on the lagoon, a rickety jetty, a slipway, a smokehouse, a store shanty to two...In 1856 the barque *Louisiana* from New Brunswick took on a surprisingly varied list of stores – arrowroot, two casks of smoked muttonbirds, coffee, sugar syrup, grapes, papaya, six walking sticks, one bale muttonbird feathers. The captain also notes that they traded a four year old whaleboat for a ton of onions” (Park 1982: 53).

The eventual decrease in outside shipping prompted the formation of a partnership on the island by three residents, with Thompson, Field and Wainwright having equal shares in a small trade vessel, the *Sylph* which began exporting LHI’s unique red onions and other occasional produce to Sydney from 1867 (Nichols 2006). The *Sylph*’s trade, though welcome was not sufficient to replace the declining provisioning trade, and when the Water Police Magistrate Cloete and his party visited LHI in 1869, trade continued but the decline was being felt:

“They seem to be very fairly provided with the necessaries of life, but lack money, as their trade with the whalers is, in great part, carried on by barter. They exchange pork, potatoes, maize, fowls, and onions, for tea, sugar, clothes, &c., which must be taken at the whalers’ valuation” (Hill 1869: 37).

“The present population appear to be poor from the fact that their supply is far above the demand, and [have] no means of regular transit. This was far different in the golden time of California, when whale-ships and other vessels called to get

supplies in exchange for various commodities....The supplies now remain on hand, less cultivation is needed, and the people are living from hand to mouth, and are chiefly engaged in the cultivation of maize and potatoes for home consumption, and onions for the Sydney market, or the whole to supply any ships which may call in need of necessaries” (Hill 1869: 48).

One of Cloete’s party was commissioned to report on the renewed proposition of a penal settlement on the island, and Hill’s comment that such a turn of events would perhaps be a positive alternative to the situation that the islanders currently found themselves in is particularly telling (Finch and Finch 1967; Hill 1869):

“Lord Howe island, from its position, climate, and capabilities, would be most suitable for a penal settlement...However painful the process might be of breaking up the homes of the present residents, some of whom have been half a lifetime on the island, nevertheless as they have avowed their poverty, or that their means are too slender, and that they are living from hand to mouth, and in some instances (to use their own phrase) dodging the workhouse, and without some help they are unable to cope with adversity or better their condition, perhaps it would be advisable for the Government to step in and relieve this state of things” (Hill 1869: 57).

“The disposition of its present population may be arranged in such a manner that it would be of material benefit to those who may choose to adopt the proposition – namely, that they be concentrated into a village, and be the caterers or contractors to the Government for all such supplies that they could raise – having sufficient lands allotted to them for that purpose, and those who thought proper to vacate to receive a remuneration for the labour they had expended in clearing their land and for the stock which they would hand over, together with any right which might exist in the brands of those running wild” (Hill 1869: 58).

Despite Hill’s positive recommendations regarding the possibility of a penal colony on the island, the proposition was finally completely given up, and for good or ill LHI was left to its increasing remoteness as a civilian settlement (Finch and Finch 1967; Nichols 2006). By the time of the visit of the HMS *Pearl* in 1876, the islanders were in an even more pronounced state of isolation as the *Sylph* had been lost at sea with all hands in 1873, and the island had not had a ship call in the three years since (Corrie 1878; Hutton 1998; Nicholls 1952; Rabone 1940). The ship’s surgeon, Alfred Corrie wrote at length about what he and his party encountered on the island (Corrie 1878):

“I regret to say we found some of them almost in a state of starvation; vessels from New Caledonia and Sydney, which were in the habit of calling, had failed to do so for some months. Their produce, onions, potatoes, &c., which they give in exchange for tea, sugar, salt, clothing, &c., was completely rotting in their store-houses” (139).

“I am glad to state we were able to assist them a little by sending on shore tea, sugar, biscuit, soap, &c., subscribed for by the officers of the ship I was on board. My old friend Mrs. Andrews told me, with a very sorrowful countenance, that she had not tasted a cup of her favourite beverage, tea, for many weeks” (140).

“But now this once much frequented and favoured little spot is apparently quite deserted; the old families have lost all zeal for cultivation, having to live as it were from hand to mouth, see the fruits of their labours decaying and rotting in their store-houses” (142).

Following the *Pearl's* visit, shipping to LHI increased marginally, as the end of the American Civil War and the sustained demand for baleen and bone saw whaling recover slightly for a short time (Mawer 1999). Furthermore, the permanent resettlement of Pitcairn islanders on Norfolk Island in 1856 and the growth of their community with the establishment of the Melanesian Mission School in 1866 eventually served to marginally increase boat traffic in the region (Edgecombe 1991). Thus the islanders were not quite as desperate as they previously were, and individuals and families continued to settle on the island periodically. Government interest in turning the island into a penal colony had completely died, but nevertheless the authorities belatedly began to take a more concerted interest in the island's affairs. Following the declaration of a botanical reserve in 1878 which covered the majority of the island, a surveyor was sent to the island to record the existing settlement and the island's first official government representative was appointed, as a forest ranger to oversee the preserve was required (Finch and Finch 1967; Nicholls 1952; Rabone 1940). Captain Richard Armstrong, a retired naval officer was sent to the island originally as Forest Ranger and Resident Magistrate but was eventually appointed to a number of official roles during his four years on the island. Armstrong undertook a number of projects aimed at improving the life and livelihood of islanders, as well as economic projects that supplemented his own considerable income and his tenure on the island marked the end of complete government apathy regarding the affairs of the island and the welfare of its residents. This increased government influence meant a greater sophistication of community resources for island governance, social growth and trade facilities and came at a time when the island's only export crop, the LHI red onion, was becoming increasingly blighted by smut (Clarson 1882). There is some evidence to suggest that efforts were made to establish another cash crop on the island, as a Surveyor's Schedule dated October 1878 denotes special leases of 12 allotments to various residents

for the cultivation of coffee (Kelly 1984). Several contemporary sources indicate that coffee grew luxuriantly and was of excellent quality, and prompted Fitzgerald to speculate in 1877 that it would make an ideal export for the island (Clarson 1882):

“A few coffee plants grow well though evidently neglected and I have little doubt that coffee might be made an important item in the trade of the island. I therefore promised (subject to approval) that 100 plants would be sent from the Botanical Gardens as an experiment, together with some shelter plants, which are much required” (Fitzgerald in Nichols 2006: 32).

Fitzgerald did send the promised plants and it seems they flourished with a vigour equal to previous crops, and in 1893 reference is made to a coffee plantation of three acre extent (TDE 1893a). However, it seems the success of this venture was limited and most coffee grown on the island was to be primarily for private consumption, which continued well into the 20th century. Fortunately these abortive trials of a new economic crop coincided with Armstrong’s efforts to improve the island’s monetary prospects and the birth of a unique industry, and the latest product provided a new economic staple well into the next century.

Tertiary Settlement Infrastructure and the Development of the Palm Industry

Lord Howe Island’s exclusive new product was the seed of the Thatch Palm (*Howeana forsteriana*), which was marketed under the name ‘Kentia’. Due to the palm being native to a southerly latitude, it is well adapted to lower intensities of sunlight and moderate temperatures, thus making it a suitable indoor species. These particular properties of the Kentia and its attractiveness as a potted plant made it a favoured species in European, British and American parlours and greenhouses, and as it was exclusively native to LHI it was a secure export for the island community (Finch and Finch 1967; Hutton 1998). The exact beginning of the industry is hazy, as several islanders had a history of sending specimens of unique island flora to various botanical collectors and gardens in Australia and England for many years, and a number of individuals were involved in early exports of the seed; Edward King and William Nichols are equally credited as being the first exporter of seed to Sydney in 1878, while T.B. Wilson is thought to be the first exporter to the United Kingdom in 1880 (Edgecombe 1987; McFadyen 1992; Nicholls 1952; Rabone 1940). The first recorded island sale of seed occurred on December 7th 1881, when Messrs Tapsell, Cameron and Cresswell landed from the *Levuka* and purchased a

quantity of palm seed, probably from Captain Armstrong (Nichols 2006; Rabone 1940). From this time onwards increasing quantities of palm seed were collected by islanders and exported to agents and nurserymen in Sydney, who would either produce seedlings to sell to the domestic market or ship the seeds to nurseries in Europe, Britain and America (Finch and Finch 1967; Hutton 1998; Nicholls 1952).

Other potential economic ventures were trialled on the island with limited success, most of which were instigated, operated or encouraged by Armstrong. Upon Armstrong's appointment he was granted leasehold of 100 acres of land for the purpose of collecting *Kentia* palm fibre to be shipped to the mainland for furniture and mattress stuffing. The fibre was also used for toilet paper and storing produce, and green lemons and onions packed in the fibre were said to keep for up to three months (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). This venture appears to have had moderate success as Armstrong imported three workers from New Caledonia in 1879, and they assisted in the palm fibre venture as well as in the construction of public facilities such as the first island road and the schoolhouse in 1879, for which they were paid in tuition from the first island schoolmaster, Thomas Wilson (Edgecombe 1987; Lord Howe Island Central School 1979; Nicholls 1952; Rabone 1940). Armstrong's official roles on the island grew to incorporate Registrar of Births, Deaths and Marriages, Postmaster, Clerk of Petty Sessions and Coroner and the activities he instigated (primarily in the role of Magistrate and Ranger) included the planting of various eucalypt species and Norfolk Pine (*Araucaria heterophylla*) for timber and firewood, new crop experimentation and dynamiting reef obstructions from North Passage (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). Any outside opportunities for community growth were encouraged, and when the government granted New Zealand company Henderson and MacFarland a lease on the Admiralty Islands to collect and ship guano in 1881, Armstrong was fully behind the venture:

“...a person arrived on the island to take charge of the interest and to manage the affairs of a company which had...a licence to work the deposits of phosphatic guano abounding on Lord Howe and the adjacent islets known as the Admiralty Group. Seeing a prospect of remunerative labour to the islanders, and the opportunity this was likely to afford for constant communication, giving them the means of conveying their produce to market, I encouraged in every way the action of this company” (Armstrong in Finch and Finch 1967: 66).

Despite the positive changes brought about by the presence of a Government official on the island, tensions began to grow among groups of islanders who were much

more inclined to continue in their previously self-governing state. These sentiments were encouraged by minor infringements upon their former liberties; Armstrong suppressed liquor on the island by shutting down the two local stills that produced strong spirit from banana and fig leaves and supplied islanders with liquor from his own store for medicinal use (Finch and Finch 1967; Nichols 2006). Armstrong was also in possession of the only lease on the island and made a tidy living from the salaries of his numerous offices, and as such his comfortable position probably added to the grievance felt by those who had farmed on the island for a couple of generations and had little monetary wealth or security to show for it (Nichols 2006). Armstrong's efforts to encourage the development of the palm seed industry were also possibly seen as a threat to the islanders own fledgling seed enterprises, and the culmination of this brewing situation was a petition for Armstrong's removal being submitted by a group of islanders in 1882 (Finch and Finch 1967; Hutton 1998; Nichols 2006). In response an investigative commission was sent to the island in April 1882, and following the recommendation of the Commissioner, J. Bowie Wilson, Armstrong was removed as island administrator (Wilson 1882). Two successive parliamentary committees exonerated Armstrong of any wrong-doing, but in accordance with objections made by islanders to his reinstatement, Armstrong was eventually paid compensation and the island was put under the authority of visiting magistrates, in line with another of Bowie Wilson's recommendations (Finch and Finch 1967; Nichols 2006; Wilson 1882).

Under the visiting magistrate system, LHI regained some of its former day to day autonomy, as the visiting magistrates usually only came to the island approximately every six months to deliberate over matters of dispute and conduct other periodic duties (Stevens 1892-1900). However, most of the offices filled by Armstrong were maintained and given to existing members of the community, who were appointed by the visiting magistrate and dealt with small island matters in his absence. The role of Forest Ranger, Postmaster and Registrar of Births, Deaths and Marriages continued in some form, and the position of Special Constable was introduced as an office of small dispute solving in the absence of the resident magistrate (Finch and Finch 1967; Nichols 2006; Rabone 1940; Stevens 1892-1900). Those islanders who filled these and other positions on the island usually gained some small salary for their labours, but the majority of income for most islanders continued to come from palm seed exports (Finch and Finch 1967; Stevens 1892-1900).

During the first two decades of the palm seed trade it appears that islanders largely operated independently, and due in part to the youth of the industry and the community's

inexperience in a large-scale export trade the majority of exporters were often exploited and underpaid for their product (Finch and Finch 1967; Nicholls 1952). This compounded the problem of increasingly competition in a small community for the sole viable economic outlet available and rivalry became so fierce that efforts to undercut each other led to very little profit for anyone involved (Finch and Finch 1967). The eventual formation of the Kentia Palm Seed and Plant Co-op Company in 1906 was the first step in breaking the stalemate but it was far from an ideal solution, as the company had only nine original shareholders, and thus excluded a large number of islanders (Finch and Finch 1967; Kelly 1984):

“...those who had not been original parties to the agreement were still in a difficult position. Their seeds could only be sold through the Kentia Company, and, since they were not shareholders, they could no legally work for a living at the only island industry. Two of the youngsters sought legal advice and ...threatened to start another company and offered violence to go with it. Magistrate Farnell...said that anyone who tried to bypass the company would be liable to five or ten years in jail” (Finch and Finch 1967: 84).

The Kentia Co-Op Company tried to alleviate the situation by offering additional shares to another 19 islanders, but problems remained as later shareholders had significantly less say regarding company affairs (Finch and Finch 1967; Nicholls 1952). Eventually the state of the LHI palm industry prompted two Royal Commissions in 1911 and 1913, and the ultimate outcome saw the Kentia Co-Op Company dissolved and an island regulatory body, the Board of Control appointed to run both the seed trade and island in general (Anon 1911a; Anon 1911b; Finch and Finch 1967). Under the Board’s direction the palm industry was still run on a share model, but one that included all island residents; men over 21 having 25 shares, women over 21 entitled to 10 shares and then 25 upon marriage, and each child 10 shares, with up to 35 shares per family allowed for children. Men and women over 31 were entitled to an additional 25 shares each, and thus in this manner all islanders had a reliable income from the island’s only profitable trade, which remained the economic mainstay until World War I (Clark 1935; Lord Howe Island Board 1988; Nicholls 1952; Park 1982).

Development of Tourism and the End of Isolation

Concurrent with the early years of the palm industry, the island population saw renewed growth, with both new settlers arriving and natural generational increases. Similar

growth on Norfolk Island prompted Burns Philp and Co to begin a regular cargo steamer service between the two islands and Sydney in 1893, and thus LHI gained a means of relatively reliable communication with the mainland for the first time in nearly 60 years of settlement (Edgecombe 1987; Finch and Finch 1967; Kelly 1984; Nicholls 1952). The commencement of this infrequent but regular service signified the end of LHI's time as a relatively independent, isolated community reliant on the fortunes of outside trade to ensure its own economic security. Regular shipping not only facilitated the growth of the palm seed trade, it afforded reliable delivery of mail and mainland supplies as well as providing opportunities for another industry (Lord Howe Island Board 1988; McFadyen 1992). Although no specifically passenger services, the steamers did convey occasional travellers to LHI and Norfolk, and as the years progressed and the ship routes began to include Fiji and the New Hebrides (Vanuatu) the numbers of visitors staying on the island increased significantly. The steamers' return journey from its Pacific destinations usually took two to three weeks, and the extended nature of island stays and the increasing volume of visitors prompted some island families to open guest accommodations (McFadyen 1992; L.E.A. 1909).

The gradual increase in tourism fortunately coincided with a downturn in the palm seed trade in the wake of World War I, and was able to provide an economic alternative for many islanders. As much of the seed market was in Europe and Britain, the war saw a sharp decrease in demand as well as major disruption to chains of supply (Edgecombe 1987; Lord Howe Island Board 1988; Nicholls 1952; Park 1982). Domestic markets for the seed remained and a reduced trade continued, but the industry was dealt another blow with the grounding of the steamship *Makambo* off the northern end of the island in 1918 (Finch and Finch 1967; Hutton 1998; Nicholls 1952; Park 1982). Some of the *Makambo*'s cargo was jettisoned but the remainder was unloaded on the island while repairs were made, and consequently the ship's resident Black Rats (*Rattus rattus*) made their escape into the island's forests (Hutton 1990; Nicholls 1952; Rabone 1940). The shipwrecked rats multiplied, and their presence was known on the island inside a year of the *Makambo* incident, and within ten years the rat's impact upon the land bird species of the island was painfully obvious:

“But two years ago the forest of Lord Howe Island was joyous with the notes of myriads of birds, large and small, and of many kinds.....To-day, however the ravages of rats, the worst enemy of mankind, which have been accidentally introduced, have made the note of a bird rare, and the sight of one, save the strong-

billed Magpie and the Kingfisher (*Halcyon*) even rarer. Within two years this paradise of birds has become a wilderness, and the quiet of death reigns where all was melody...The very few birds remaining are unable to breed, being either destroyed upon their nests or driven from them by the rats, and their eggs eaten” (McCulloch 1928: 5).

“With the birds gone, injurious insects have increased unchecked, and are destroying the produce of the island gardens. Fruit flies have ruined the peaches, and caterpillars of many kinds are stripping the leaves from shrubs and trees. The rats also eat the corn ere it ripens and extract the pulp from bananas, pomegranates, and other fruits while they are hanging on the trees. Nothing is safe from their rapacity, and dire distress threatens the residents unless some unsuspecting cause brings about a reduction of the rats and an increase of the insectivorous birds” (McCulloch 1928:5).

The rats not only destroyed birds and food crops, they also consumed large amounts of palm seed, with the remaining seed being ravaged by the weevils that proliferated in the increasing absence of insectivorous birds (Hutton 1998; Nicholls 1952). Numerous efforts to curtail the effects of the rats were made, including the establishment of a rat bounty and introductions of owls to hunt the rats and insectivorous birds to control the weevils and other insect pests (Finch and Finch 1967; Hutton 1990; Nicholls 1952). Attempts at biological control were generally unsuccessful, and the only real impact was made by the bounty on rat-tails, which persisted from 1920 into the 1930s (Hutton 1998). Paradoxically, the rats provided a supplementary source of income for the islanders, whose earnings from palm seed were reduced as a result of the infestation. As beneficiaries of the palm seed trade, every islander was required to devote a certain amount of time every month to rat control, and the annual take of tails in 1927 and 1928, 13 771 and 21 214 respectively gives an indication of the magnitude of the plague (Hutton 1990; Lord Howe Island Board 1998). Despite these efforts the rats remained a significant problem, but the palm seed industry continued throughout the depression years before being closed down by World War II. Reduced demand for luxury items coupled with Burns Philp and Co’s island shipping being largely diverted towards the war effort completely killed the palm seed trade, and severely curtailed the tourism industry (Hutton 1998; Nicholls 1952).

During the war the island economy became agricultural again, with many families growing vegetable and flower crops for seed, which was exported to the mainland in large quantities along with small volumes of frozen fish (Hutton 1998; Nicholls 1952). At the close of the war tourism returned as the primary earner for the island, and it has remained the main economic force up to the present. The majority of later 20th century development

related to the industry's needs, such as the operation of passenger flying boats to the island from the late 1940s to the 1970s and the construction of a modern airstrip in 1974 (Edgecombe 1987; Hutton 1998). The palm industry saw a revival in the 1960s and continues on the island under the direction of the LHI Board, and is a major source of Board income for community infrastructure and services such as rubbish collection and electricity generation (Edgecombe 1987; Hutton 1998). The current incarnation of the Board of Control came into being following the passing of the *Lord Howe Island Act 1953*, and its amendment in 1982 (Edgecombe 1987; Hutton 1998). The LHI Act had a significant impact on the development of the island as it finally granted perpetual leases to long-term island residents, ending 120 years of virtual 'squatting' by islanders and formalising processes of future community growth. Another major factor influencing the current mode of governance in LHI is its World Heritage Area status, which provides the main focus of tourist marketing and drives a very conservation focussed approach to the island's development, ensuring that settlement size and activities are sustainable.

Chapter Four

Buried Lives: Archaeological Investigations

Analysis of the sources outlined earlier suggested that the existence of sites of archaeological significance on LHI was highly probable. Despite the relatively short period of human occupation on the island, there have been many social and economic processes that have influenced the development of settlement. Occupation, abandonment, re-occupation and long term settlement at numerous locales on the island have led to the creation of a variety of ephemeral and extant sites covering all aspects of community life on the island in the past and present. Domestic, agricultural, industrial, commercial, social, administrative and memorial sites from different periods are all present, and contribute to the archaeological and heritage significance of the island.

In Birmingham, Kelly and Tanner's 1984 study, 56 sites of heritage significance were identified, with half of these including potential archaeological sites. Their study was intended as a preliminary assessment of all potential heritage sites on the island for management purposes, constituting a generalised rather than in depth archaeological assessment of each site. Following from Birmingham's assessment, independent historic research and community consultation, six sites of research interest were identified and permission was obtained to conduct surface investigations of all six and excavations of up to four. In addition to a more detailed examination of three of the sites identified by Birmingham, Kelly and Tanner, at least three new sites not previously identified were found. These sites are generally clustered to the northern and southern extremities of the island, and their occupations cover from 1834 to at least 1918 and are comprised of domestic, agricultural and possibly industrial sites.

For the purposes of this project these six sites have been dubbed: Old Settlement Beach Hillside (1), Old Settlement Beach Foreshore (2), North Bay Swamp (3), North Bay Garden (4), Wright/King Land (5) and Perry Johnson Land (6) (see Figure 4.1). Sites one, three and four all occur within the bounds of the Permanent Park Preserve, while sites two, five and six are situated on three separate privately held leases. None of the six sites have domestic occupation on them, with three sites being part of grazing leases and the other three being completely abandoned and almost forgotten by the local community. Each of the six sites were selected as they cover the time period of research interest, are

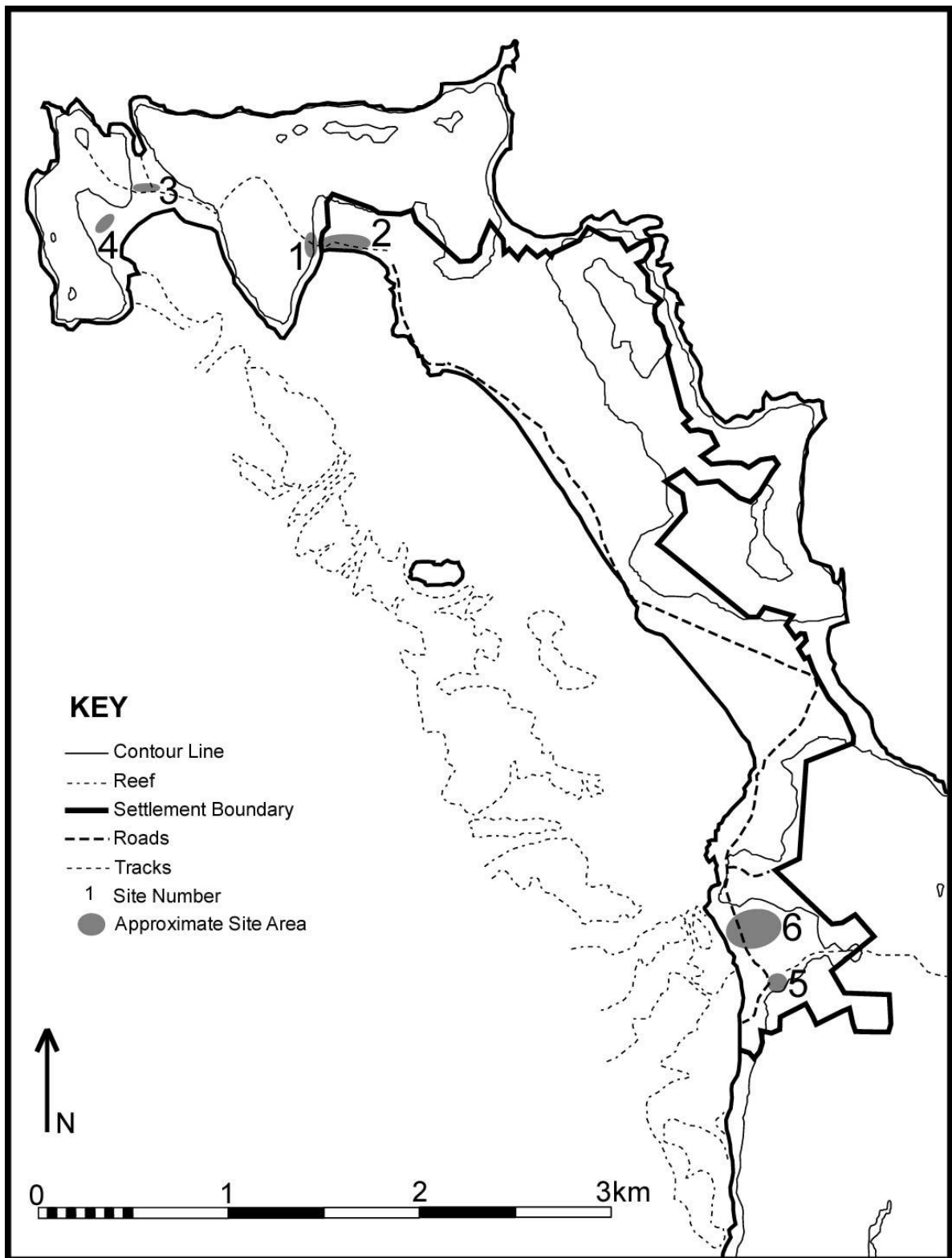


Figure 4.1: Location of the six research sites

representative of contemporary sites, and research activities would have virtually no impact on lease holders as the sites are no longer domestically occupied.

Hunter Bay

The first location of occupation on LHI is known to have occurred in Hunter Bay, in an area now commonly known as ‘Old Settlement Beach’ (OSB). Historic evidence suggests several phases of occupation and possible abandonment, and consequently two locales of interest were identified within the area. These have been dubbed ‘OSB Hillside’(1) and ‘OSB Foreshore’(2), and although both places have overlapping histories, they have been identified as separate sites for the purposes of this project.

White’s 1835 map (see Figure 4) shows the dwellings belonging to the Ashdown, Bishop and Chapman families at the western end of the bay, with cultivation being undertaken further south in the area behind Blinkenthorpe Beach (Edgecombe 1987; Nicholls 1952; Rabone 1940; White 1835). While later sources indicate that cultivation may have taken place elsewhere during their occupation, it appears that Hunter Bay was the sole area of domestic occupation during the seven years Ashdown, Bishop and Chapman occupied the island. When Poole and Dawson bought out their interests in 1841, there is no indication as to whether the occupation at Hunter Bay was still on the original hut sites recorded in 1835 or if settlement had spread from those original five sites (Anon 1849; Nicholls 1952; Rabone 1940). Poole and Dawson’s take over of the LHI provisioning enterprise meant an influx of new people brought to the island as workers, sparking agricultural and domestic expansion outside Hunter Bay. By 1844 the Wrights were farming and residing at the very southern end, the Foulis family along with the Andrews and possibly Platter, Slade, Thom and Varney were establishing residences and gardens near Windy Point. It seems likely that occupation at Hunter Bay would have changed in nature at this time, if not before (Nicholls 1952; Rabone 1940). Dr Foulis’ 1851 ‘memory map’ of 1840s occupation shows six ‘settlements’ in the vicinity of Hunter Bay (see Figure 4) which are positioned on the foreshore of the bay, rather than lining the creek along the western foothills as in White’s map. Birmingham noted that a local informant confirmed that “casual excavation in this locality ... has usually produced bits of brick rubble and other debris below the surface” confirming the presence of archaeological remains on the OSB foreshore (Birmingham 1984:3). A residential and commercial occupation by William and Hannah Nichols sometime after 1871 is recorded, but from observations it appears that the modern occupation at the eastern end of the bay coincides with the Nichols site (Edgecombe 1987).

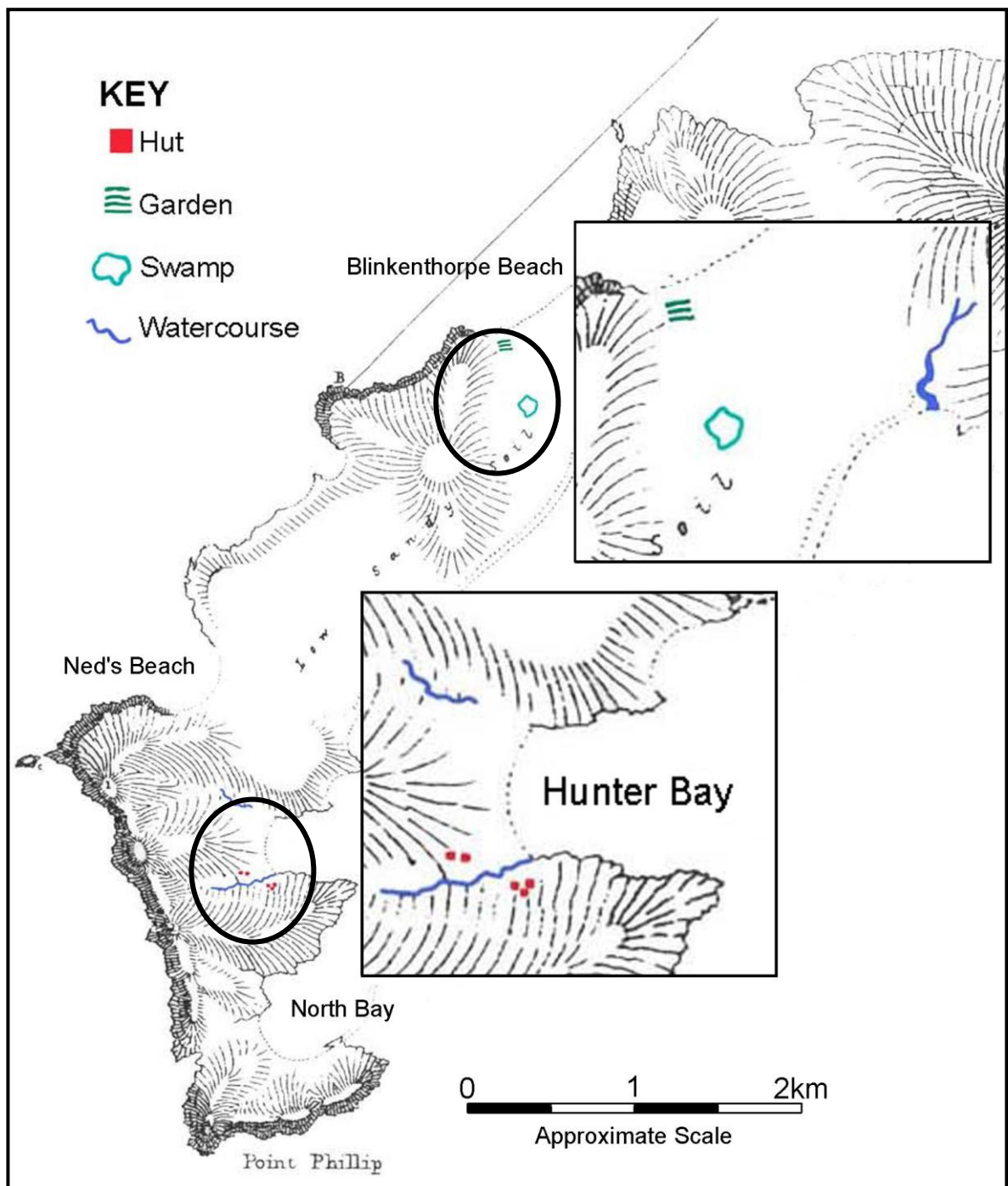


Figure 4.2: After White's 1835 map showing the location of Ashdown, Bishop and Chapman's five huts in Hunter Bay, and agricultural gardens behind Blinkenthorpe Beach in December 1834.

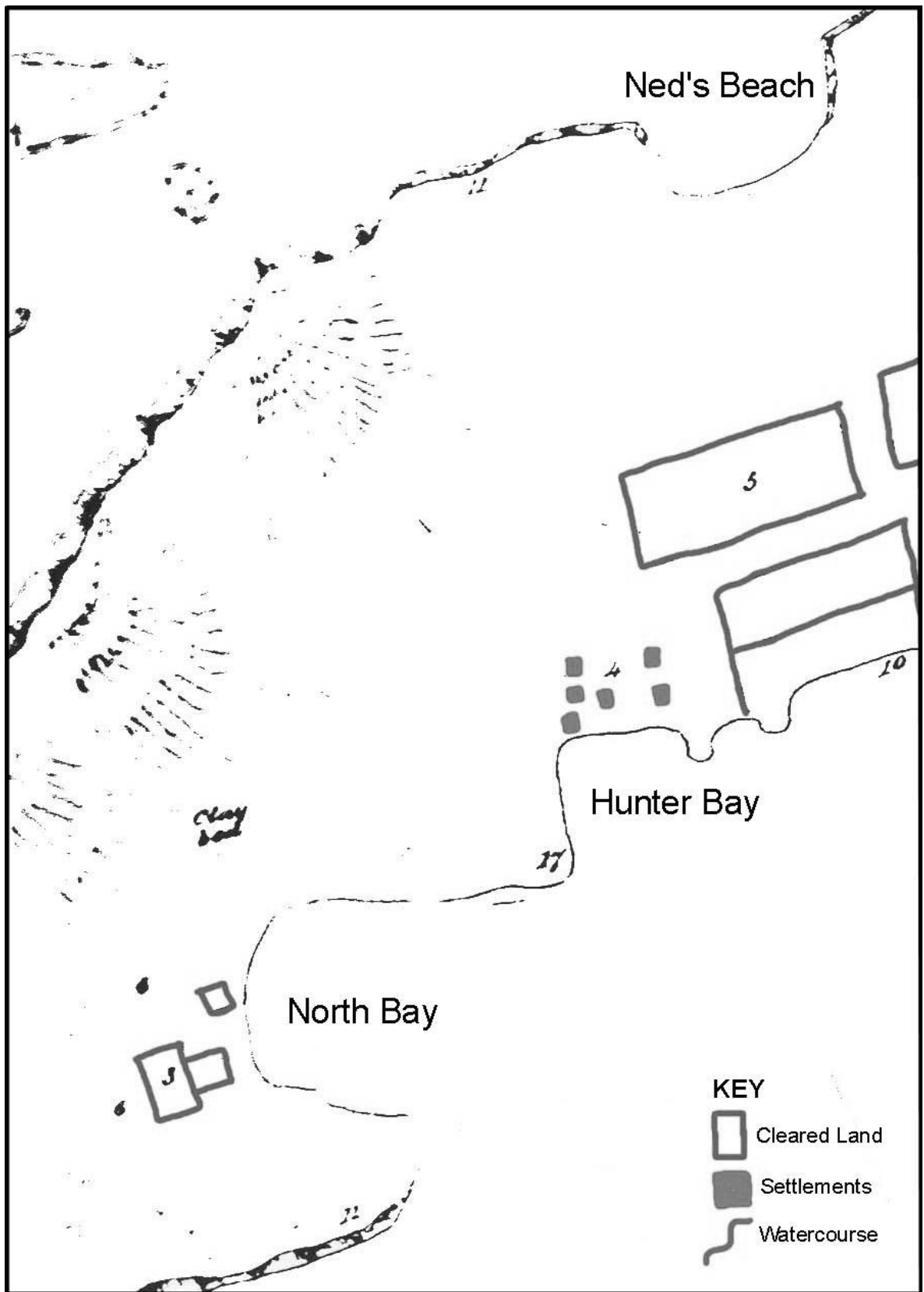


Figure 4.3: After Foulis' 1851 memory map showing 'settlements' in Hunter Bay during his residence from 1844 to 1847.

No historic evidence of subsequent settlement at the western end of the bay has been found, however consultation with local informants revealed that this area had been used as a rifle range in the 1920s-1930s (Fenton 2004; Young 2003-2004). At least three offal pits in use from about the 1960s occur in a small cluster adjacent to the identified rifle range dugouts (Young 2004). The surface evidence of these activities on the foreshore is most likely the disturbance that Birmingham (1984) noted from a 1970 aerial photograph. These two disturbances appear to be contained within their respective areas of approximately 10 and 5 square metres and do not appear to have affected adjacent sites as there is now evidence that there are several archaeological sites that have maintained integrity on the OSB foreshore.

Old Settlement Beach Hillside (1)

Preliminary Investigations

Following detailed scrutiny of White's 1835, taking into account the changed course of the marked creek, a survey area was designated and a pedestrian survey was undertaken along both sides of the creek on the flat and foothills. This resulted in the discovery of what was thought to be the likely location of the three huts marked on the west side of the creek on White's map. The site consisted of what appeared to be a partially levelled terrace and an unusual shaped clearance line into the native palm forest on the western foothills, which has since been revegetated by *Pennisetum clandestinum* (Kikuyu Grass), an exotic species often introduced for soil stabilisation and grazing (Thompson 2004). The thick cover of *P. clandestinum* across the whole site prevented any observations of artefact scatters or other surface features to confirm it as a site, but the correlation of the unusual clearance line, the appearance of a levelled area and the similarity to the location marked on White's map made it worth investigating as a likely site of three of the 1834 huts (see Figure 4.4).

Survey and Ground Penetrating Radar Results

Upon reinvestigation of the area in 2004, a second area of interest on the other side of the Max Nicholls track was identified and marked for clearance, along with the original area. Due to these areas being within the bounds of the Permanent Park Preserve, and the general locale being only one of two known locations of an endangered plant on the island,

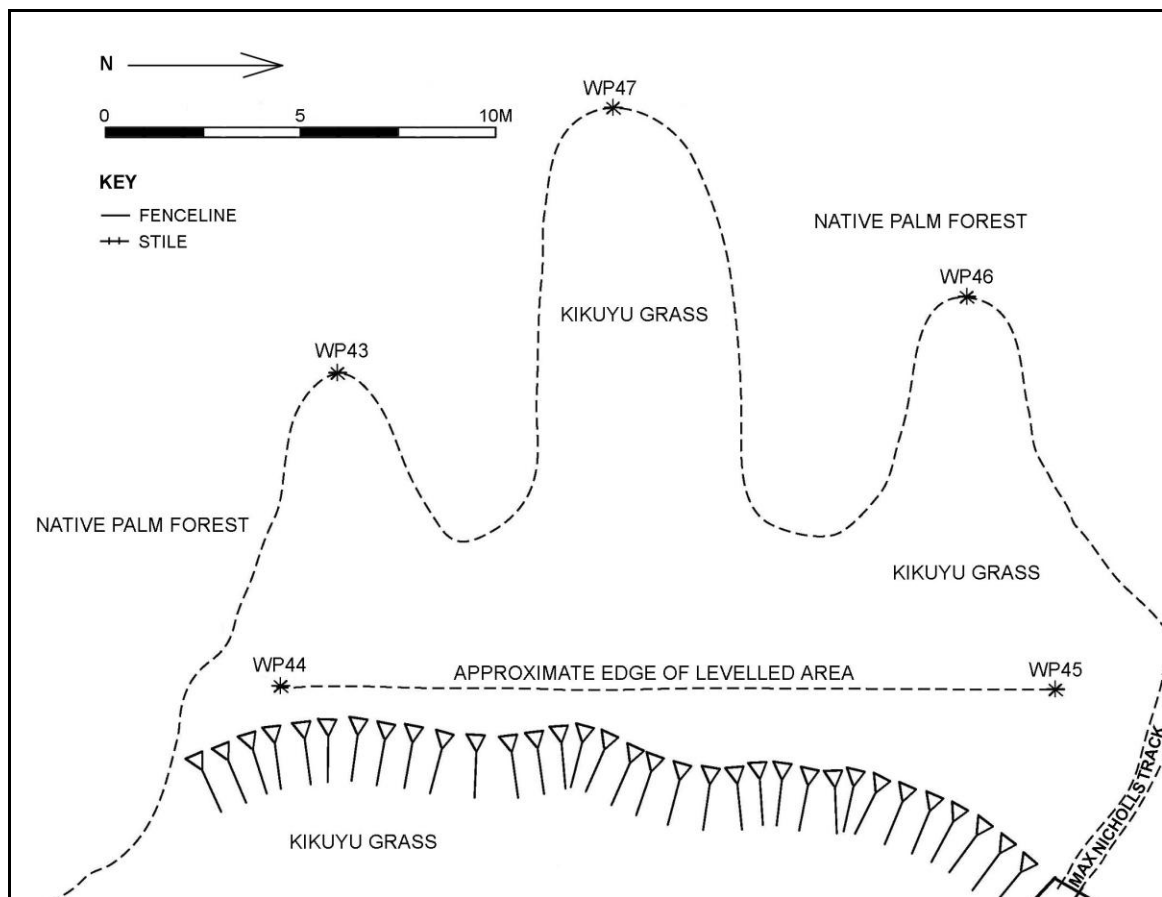


Figure 4.4: 2003 GPS survey sketch of OSBH 'site' showing clearance line

vegetation clearance was restricted to the removal of introduced species, primarily *P. clandestinum*. Vegetation clearance was more limited than previously expected, but was sufficient to assess the nature of the sites. In the original area (a) identified in 2003, a relatively featureless ground surface with an even slope was revealed, with no notable features present. The undertaking of four site profiles confirmed the unremarkable slope of the ground, and GPR and shovel tests further revealed the complete lack of any remains on the site. The second area (b), showed even less promise, with a portion of its even slope being created by previously undetectable deadfall. Each area was surveyed and are illustrated in Figures 4.5 and 4.6 along with the profiles of the slope in area (a) (Figures 4.7-4.10).

Given the lack of any tangible evidence on these sites or in their immediate vicinity, it appears that this is not the area recorded on White's map. Due to the distorted nature of the map, and the possibility of significant land slippage and silting in the creek, it is likely that the actual site is nearby, but undetectable. As the immediate surroundings of the investigated clearings are predominantly vegetated with thick native palm forest, the

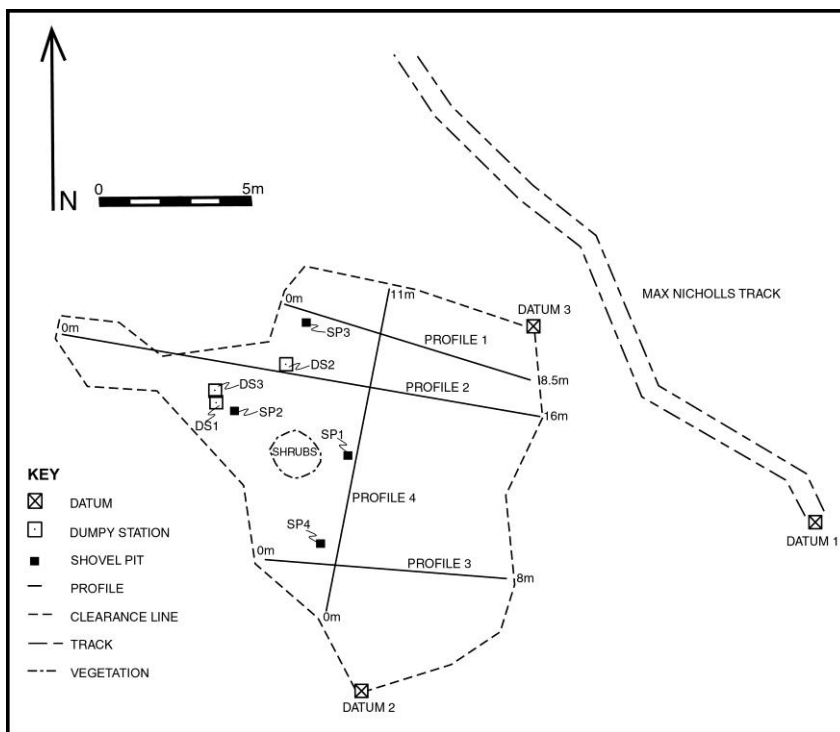


Figure 4.5: Survey of area A on OSBH showing profile and shovel test locations

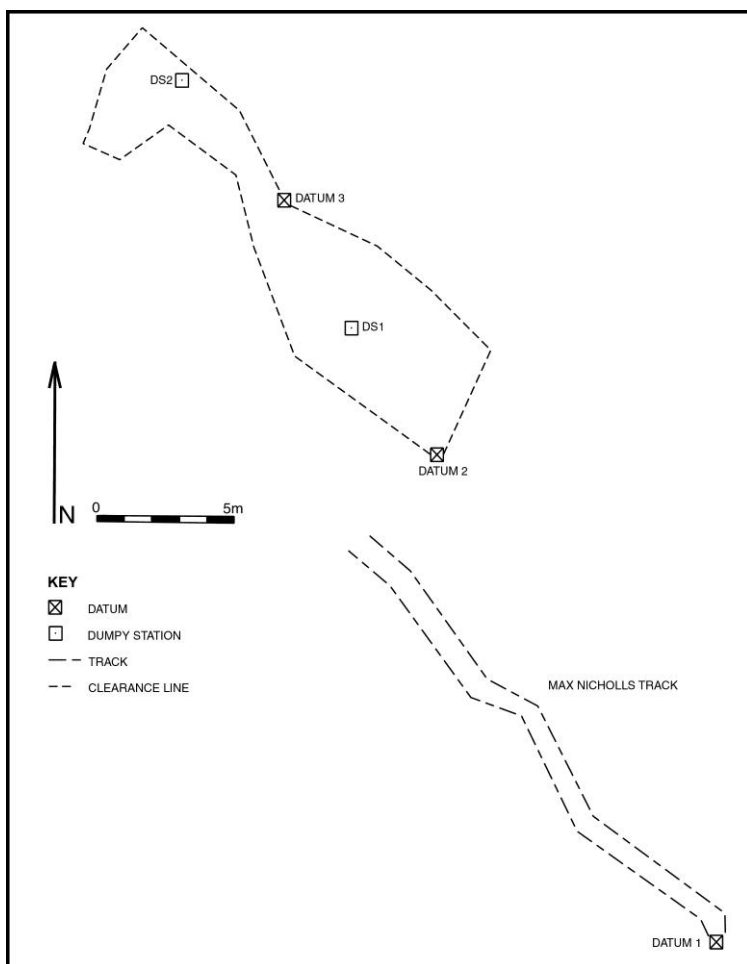


Figure 4.6: Survey of area B on OSBH

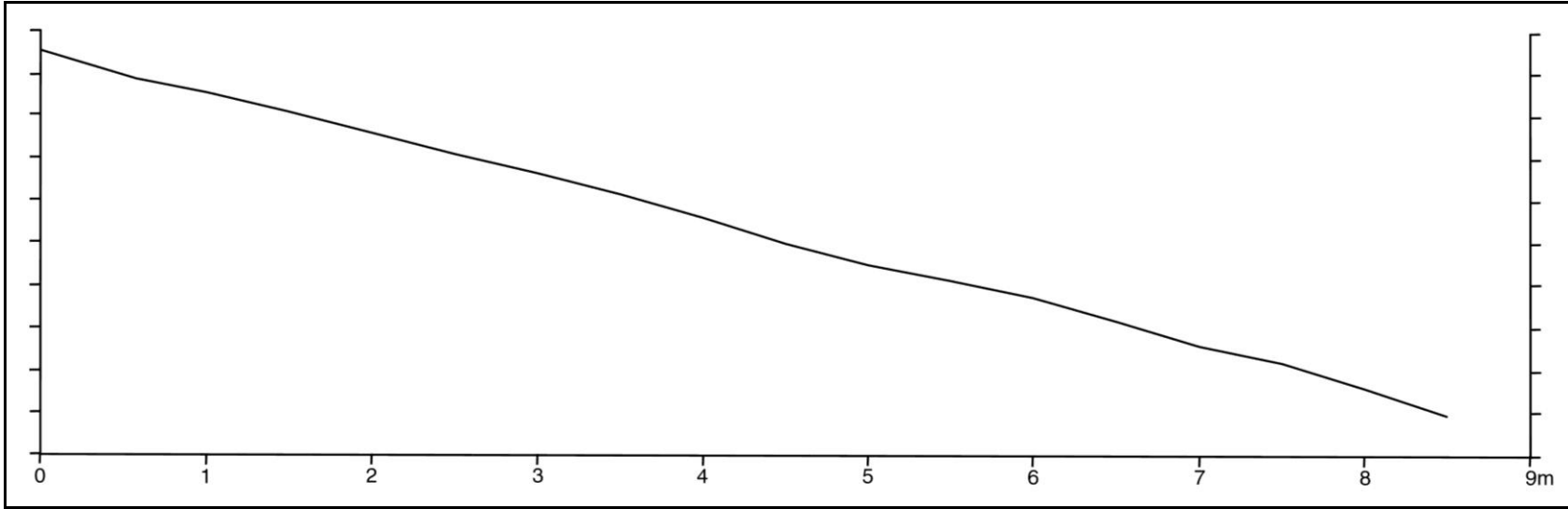


Figure 4.7: Profile 1 of OSBH showing an unremarkable even slope

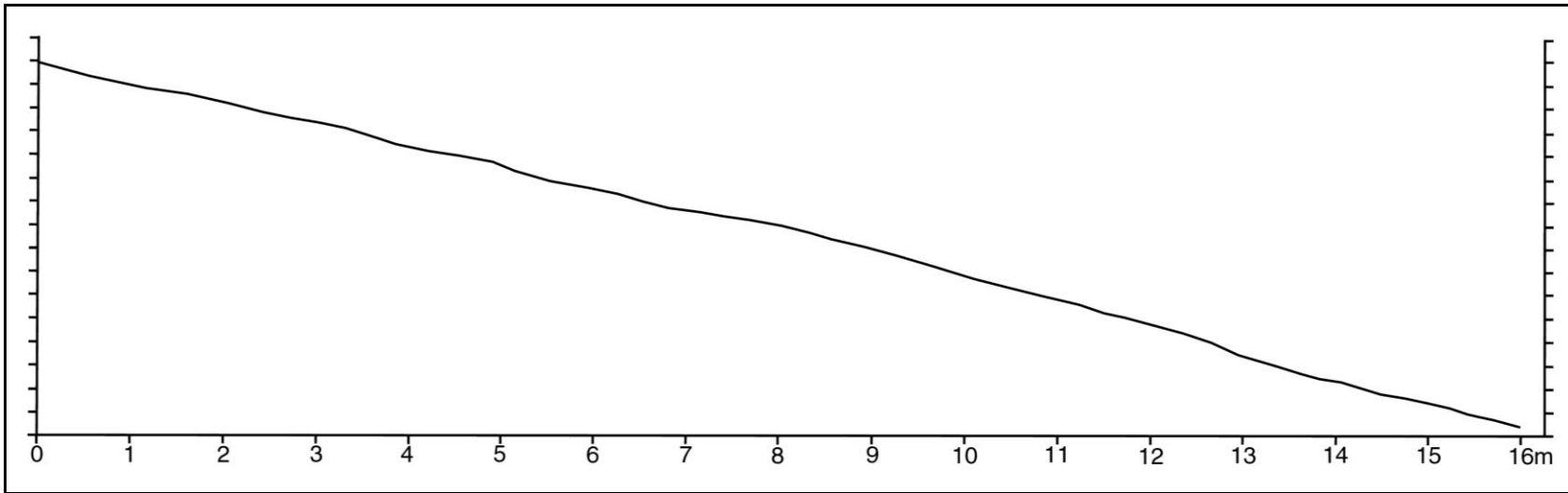


Figure 4.8: Profile 2 of OSBH again showing an unremarkable even slope over a greater distance

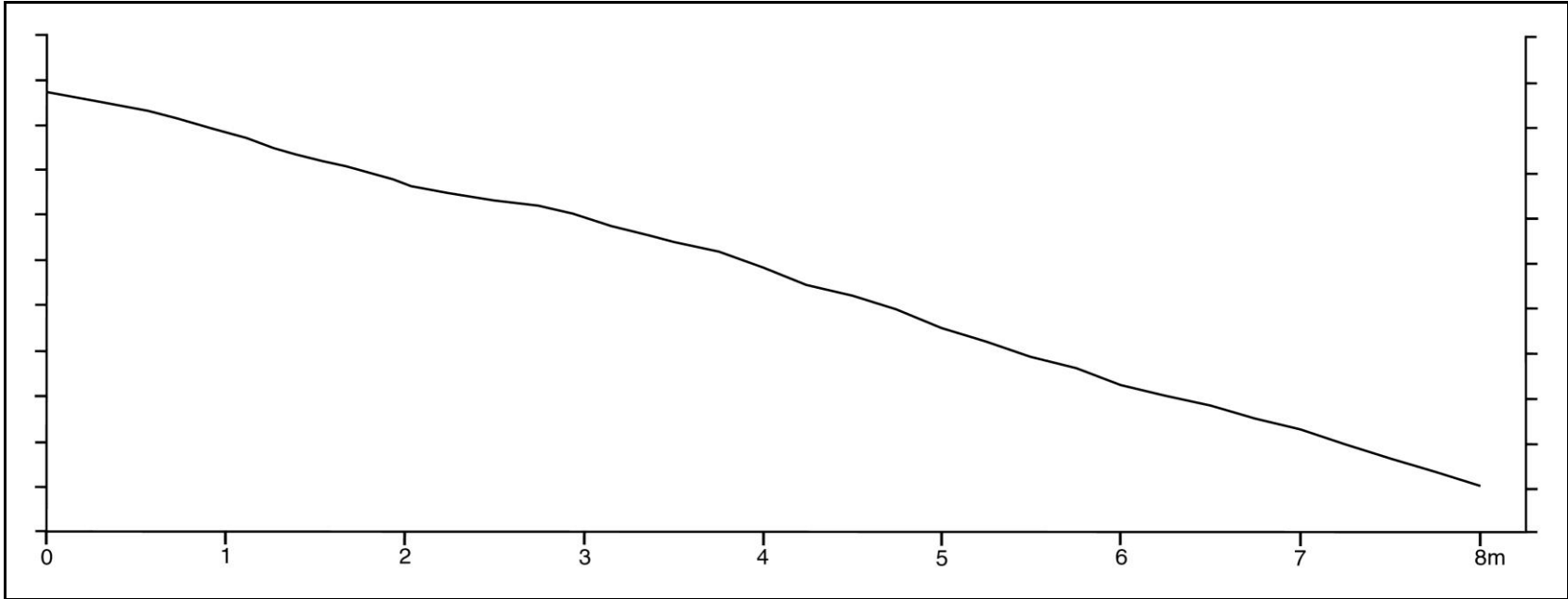


Figure 4.9: Profile 3 of OSBH

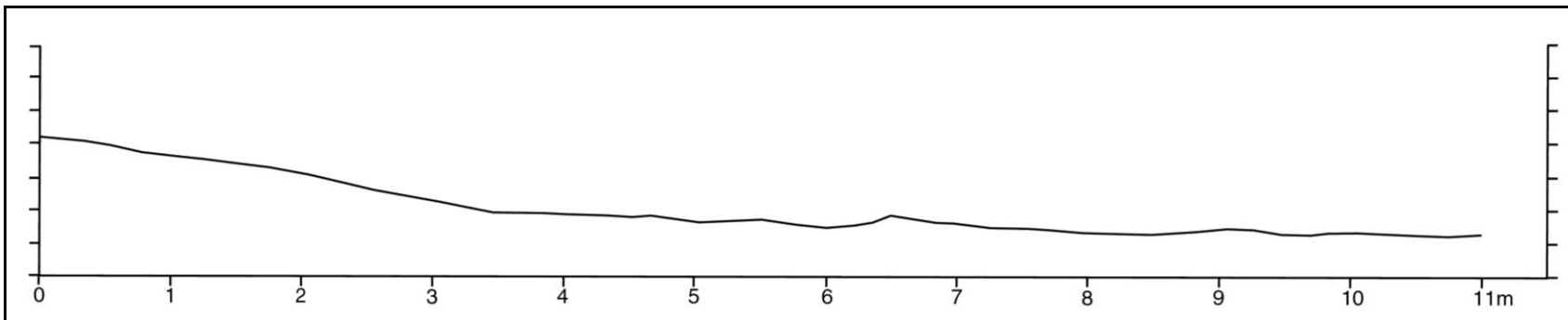


Figure 4.10: Profile 4 of OSBH running across profiles 1, 2 and 3 showing no remarkable features

likelihood of pinpointing an alternative location or investigating it is slim; unless special provisions for the clearing of a large portion of forest were made for the specific purpose of locating the hut sites. Such a large scale activity and permission process was well outside the scope of this project, and consequently the question of the location and nature of the 1834 huts had to be abandoned.

Old Settlement Beach Foreshore (2)

Preliminary Investigations

In order to locate the settlements indicated on Foulis' 1851 map, a pedestrian survey was undertaken across the entire OSB foreshore between the dune and creek which runs along the line of western foothills. Apart from the features associated with the 20th century rifle range mentioned previously, a series of regularly shaped features was observed and recorded. The site consisted of a series of eight mounds occurring at irregular intervals along the front of the OSB foreshore behind the dune, running east-west approximately parallel to the fence line. One of the mounds occur further back behind the others, and these features varied in size from 2 x 3 to 4 x 5m (see Figure 4.11). The entire foreshore is now under cattle grazing and is covered by thick grass that is kept cropped by stock. Due to the grass, no artefact scatters were discernable but distinct features such as the mounds were easily observed. The alignment of these mounds along the bay behind the small protection afforded by the dune, made it possible that these features are, or were associated with, the 'settlements' marked on Foulis' 1851 map. The only other known source relating to these particular occupations of OSB is a map drawn by Captain H.M. Denham in 1853, which shows the six 'settlements' denoted on Foulis' map reduced to two (see Figure 4.12). What is not clear is if this is an indication of reduced activity in Hunter Bay between the 1840s and 1853, or if it is merely a different system of recording settlement features on the island. Due to the lack of other documentary evidence and the ambiguity of the maps, the nature of these 'settlements' - how many people worked/occupied them and how long they were extant at OSBF, is entirely unknown.

Survey and Ground Penetrating Radar Results

Secondary observations of the area and another pedestrian survey confirmed the presence of the eight mounds first recorded. The position of the rifle range features at the

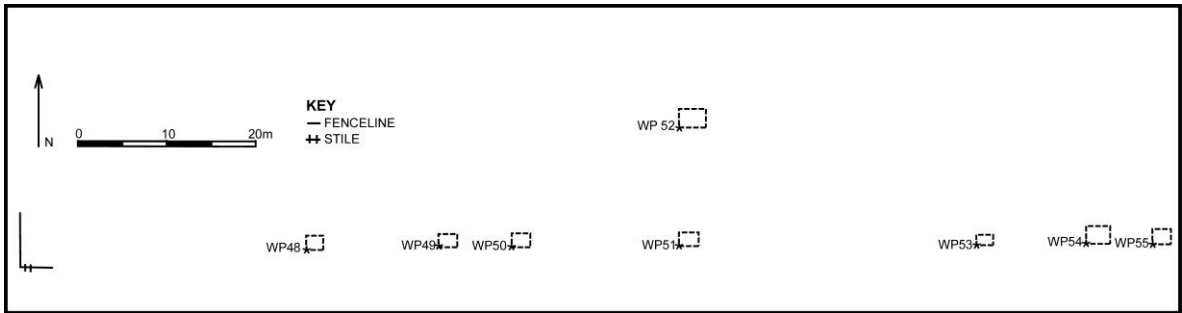


Figure 4.11: 2003 GPS survey sketch of OSBF showing series of conspicuous mounds along foreshore directly behind dune and present day fence line

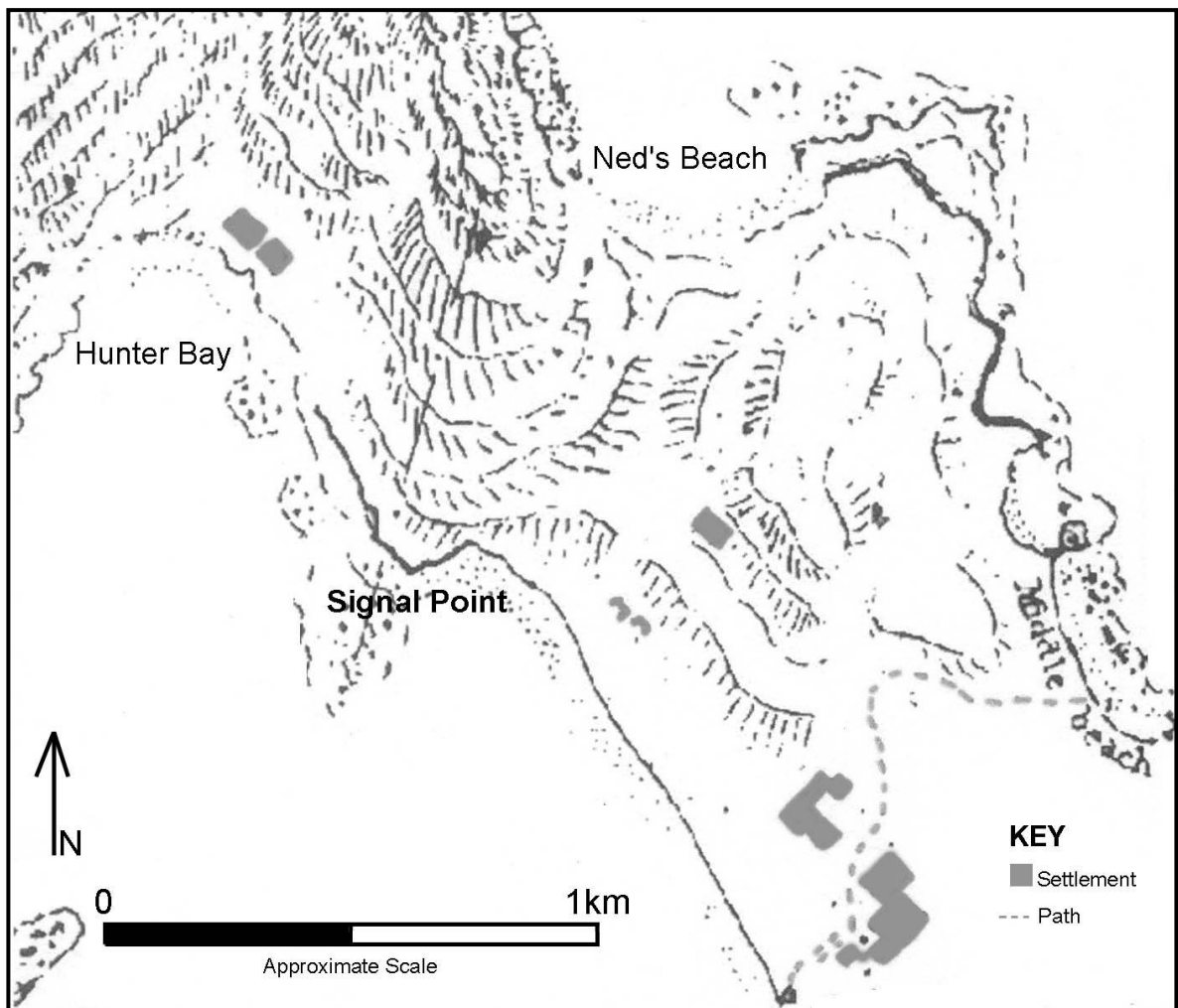


Figure 4.12: After Denham's 1853 map showing two settlements in Hunter Bay

extreme western end, and at least three offal pits to the north of the western most recorded mound were also confirmed by community interviews and observations. As these features are associated with 20th century activities, they were not included in the illustrated survey of the site (see Figure 4.13). Three profiles were undertaken across the site to confirm the presence of defined mounds; profile one extends across the two most prominent mounds in the bay, the second and third mound running west-east recorded in 2003; profile two extends across the remaining features starting at the fourth mound, west-east; and profile three runs from the fourth mound north-west back to the sole mound occurring behind the line of other features running along the fence line. Profile one (Figure 4.14) confirms the size and prominence of the features, and while profile two (Figure 4.15) confirms the presence of raised areas correlating to those recorded in 2003, their prominence is not as marked as those measured in profile one. Profile three (Figure 4.16) provides illustration of the relief of the fourth mound (and most of the other features) in the other direction, with the hollow between it and the feature at the back being where an informal pedestrian path runs.

Following the confirmation of the presence of substantial features, ground penetrating radar surveys of the mounds and intervening hollows were undertaken to determine whether any discernable features or disturbances occurred below them. The results of the radar surveys were confirmed with selected shovel pit tests to ensure that the presence or absence of features identified by the GPR was correct. Interestingly, GPR surveys and ‘ground truthing’ of all the features with the exception of two found no definitive sign of human activity at all. Surveys of the rifle range and offal pit areas also revealed very few signs of disturbance on the radar, with the signal remaining consistently clear, as would be expected with dune sand. In contrast, two of the mounds clearly showed significant subsurface features, the two mounds measured in profile one.

Following a GPR run across both features which revealed a clear, significant and consistent anomaly occurring in both mounds (see Figure 4.17), a larger more concentrated survey grid was laid out, measuring 27 x 15m (south-west – north-east by north-west – south-east). Radar runs of 27m were taken at one metre intervals along the 15 metre NW-SE axis, starting in the NW corner, and working towards the SE corner. Three dimensional diagrams of the results showed two very distinct and uniform horizons of similar material, dimension and depth occurring directly below the two mounds (Figures 3.17 – 3.20), the most prominent features in the bay. Subsequent shovel pits were dug on

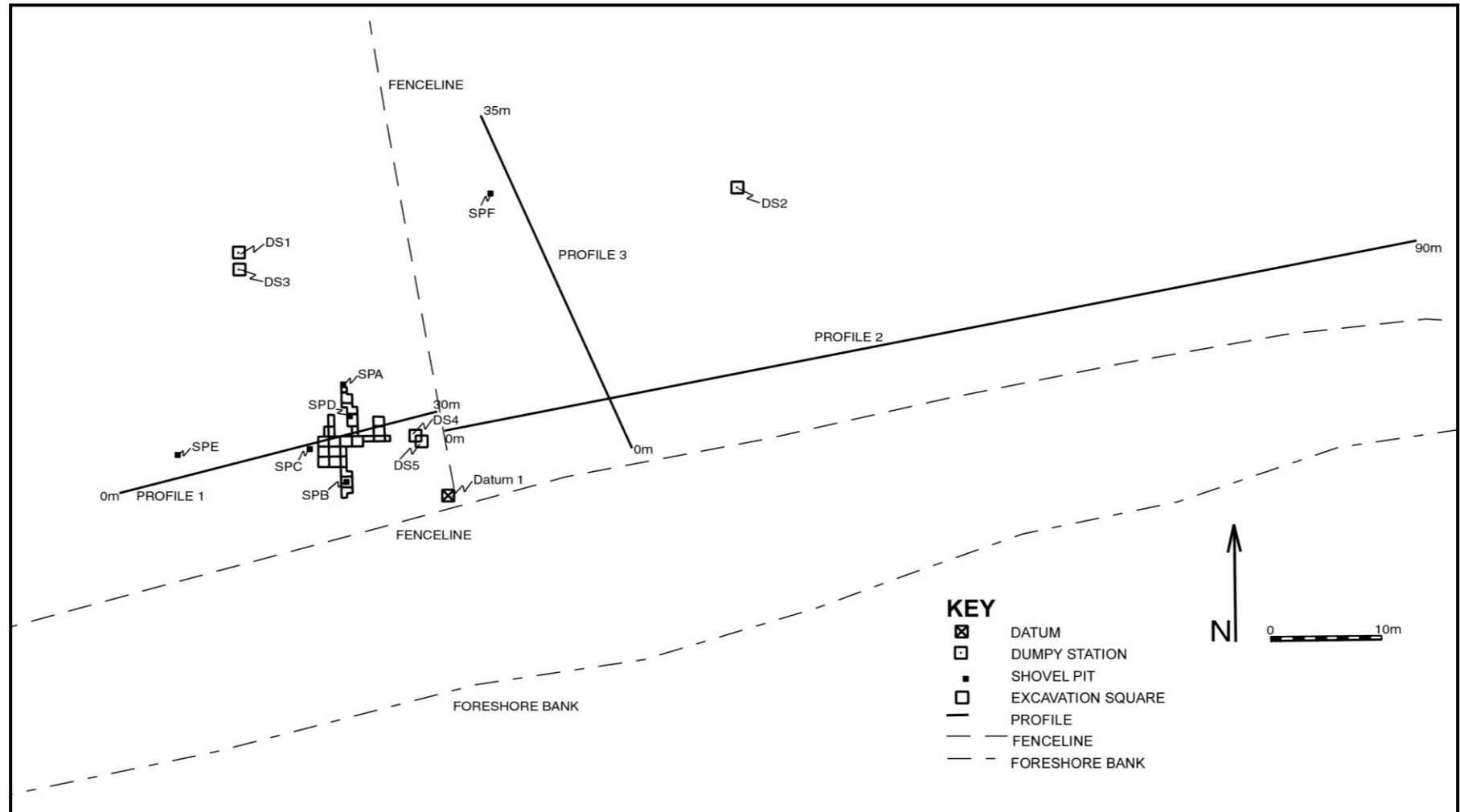


Figure 4.13: Survey of OSBF showing profiles, shovel test pits and excavation squares. Note the second fence running at right angles to the foreshore fence, which is a new installation since the 2003 GPS survey.

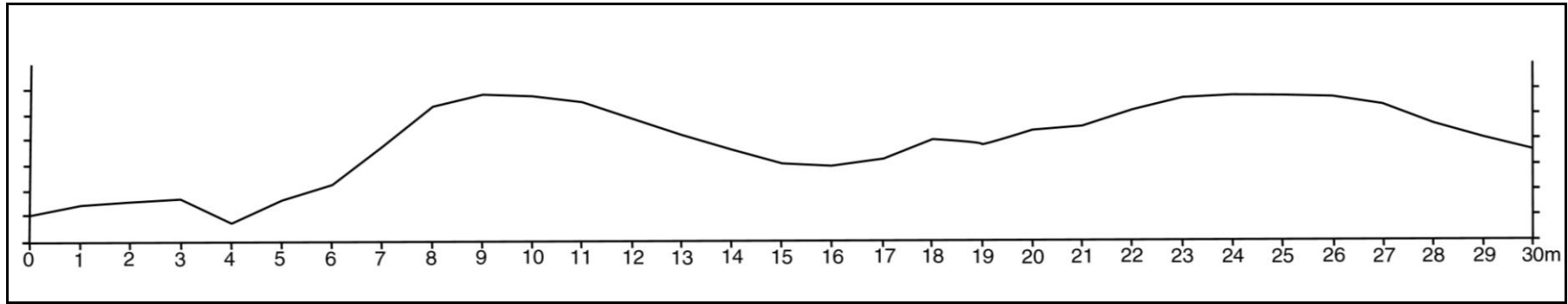


Figure 4.14: Profile 1 of OSBF showing the second and third mounds from the left recorded in 2003

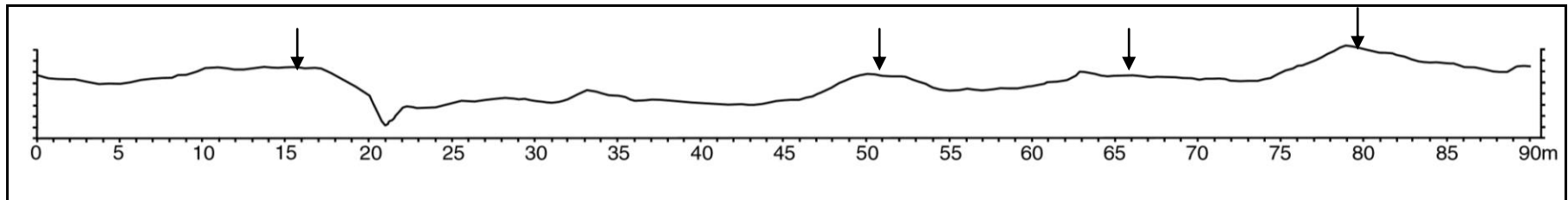


Figure 4.15: Profile 2 of OSBF showing the fourth, fifth, sixth and seventh mounds from the left recorded in 2003 (indicated by arrows)

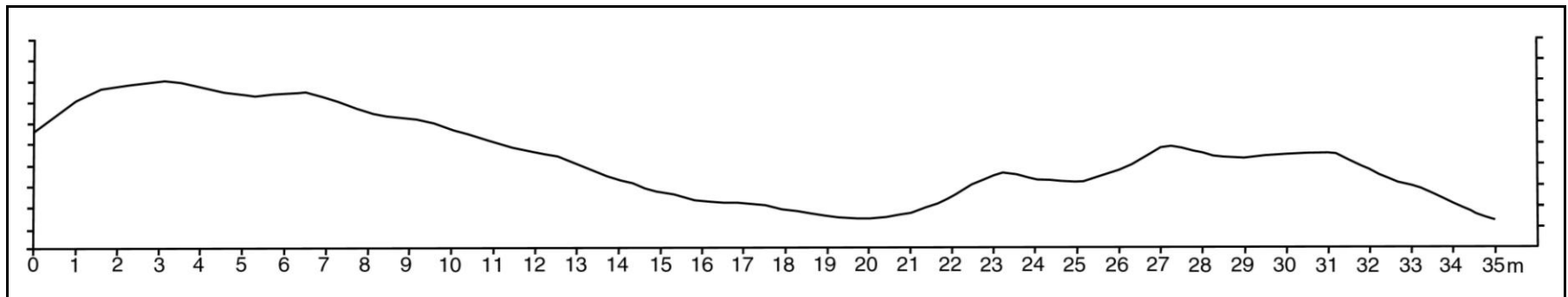


Figure 4.16: Profile 3 of OSBF showing the fourth mound along the foreshore and the eighth mound recorded in 2003 set further back

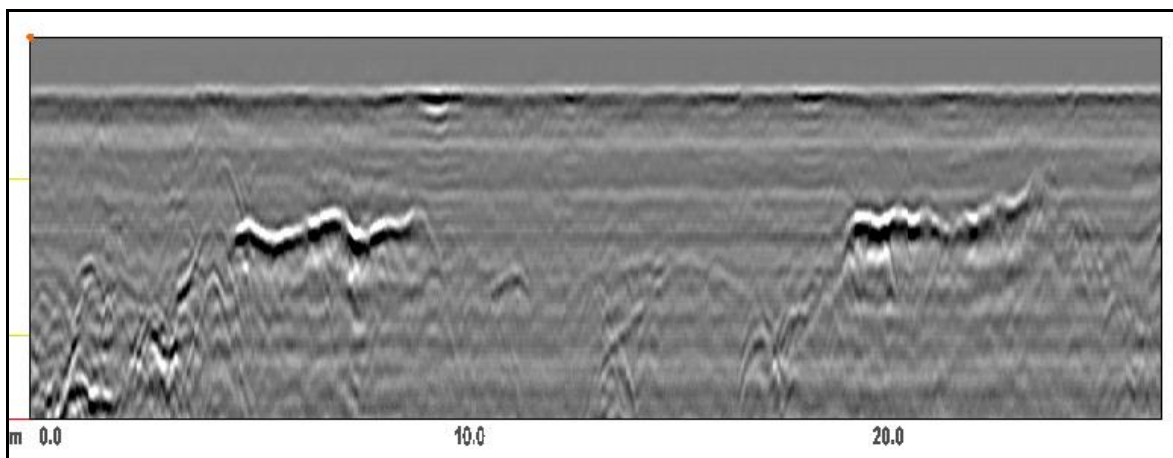


Figure 4.17: Two dimensional GPR measurement showing two very clear, consistent, and almost uniform anomalies occurring under mounds two (right) and three (left).

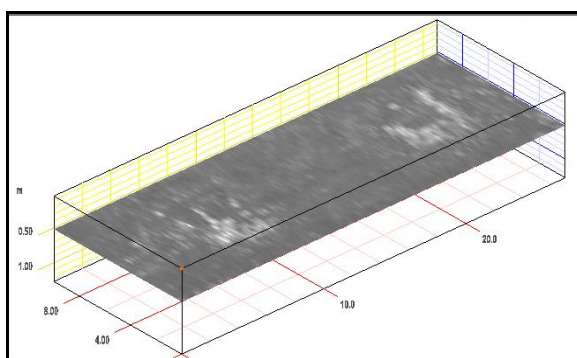


Figure 4.18: First appearance of horizons at 52cm depth. Mound three is on the left and mound two on the right

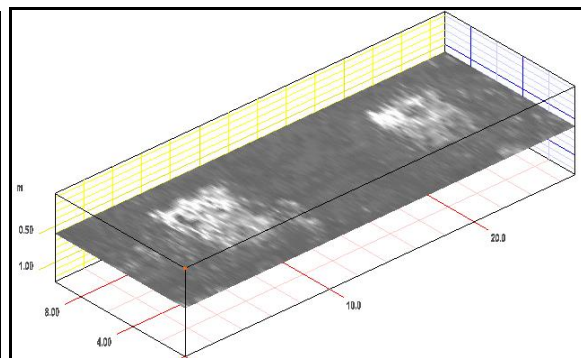


Figure 4.19: Two clear horizons are apparent at 60cm depth. Note the clarity of the matrix between the two horizons

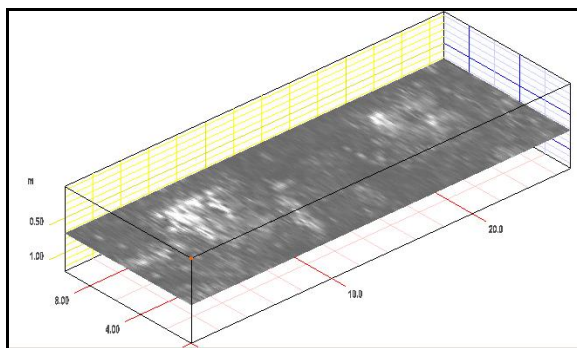


Figure 4.20: Horizons start to disappear at 72cm

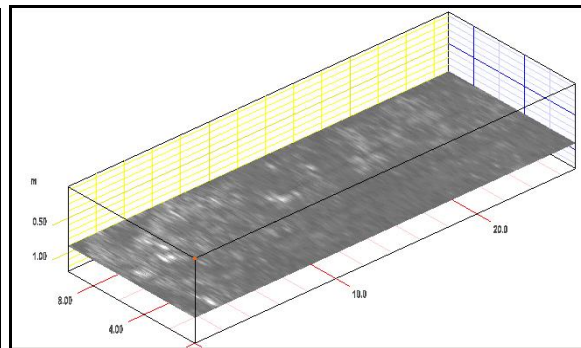


Figure 4.21: Most signs of horizons are gone at 90cm

both mounds to confirm the presence of significant anomalies, and at a depth of approximately 35cm a hard compact surface of unknown material was revealed in both pits. A small amount of bird and shell remains were recovered from these pits in the matrix 25-30cm down, but no definitive cultural material was revealed. However, given the most unusual presence of regular shaped, compacted material occurring at depth in beach dune that was not solidified sand warranted further investigation, and thus it was decided to test excavate the most eastern of the two mounds (three), as it was furthest from the rifle range and offal pits and therefore less likely to have been disturbed by these activities.

Excavation Results

Initial investigation of the mound consisted of two concurrent one by one metre test squares, to allow an appropriate size examination to ascertain whether it was a feature warranting further excavation. A substantial clay foundation surface, with an underfloor of tightly packed basalt cobbles and a large post hole were revealed in these first test pits with excavation below the level of the cobbles revealing sterile dune sand (Figure 4.22). Two shovel pits (A and B) dug to assess the possible position of the foundation margins revealed at least one likely discard zone and provided clues for the directions of subsequent excavation trenches, while also yielding a small amount of cultural material. Trenches were placed to find all four margins of the foundation (Figure 4.23), central post holes (Figure 4.24), dwelling entryway (Figure 4.25), corner construction (4.26), discard zones (Figure 4.27) and investigate substantial finds (Figures 4.28 and 4.29).

These excavations showed that the foundation consistently lay 25 to 35cm below the surface with a layer of sterile dune sand 25-35cm deep occurring across the entire site, with features such as discard areas extending from 30 to 60cm below current surface, presumably on the old dune surface contemporary with foundation construction and/or occupation. In all squares, the sterile sand was labelled feature one (see Figure 4.30) and excavated in one unit down to 15 to 20cm upon which the sand became increasingly charcoal stained. This was labelled feature two and consisted of the last 5 to 10cm of matrix above the foundation as well as extending to a greater depth beyond the margins of the foundation. As this feature contained cultural material, greater vertical control was desired, and thus feature two was excavated in units (spits) of 10cm – both in squares containing foundation where feature two uniformly had one spit, and those squares that extended beyond the foundation, where feature two had up to three spits. The



Figure 4.22: First squares with part of rock underfloor exposed and posthole



Figure 4.23: Northern edge of foundation

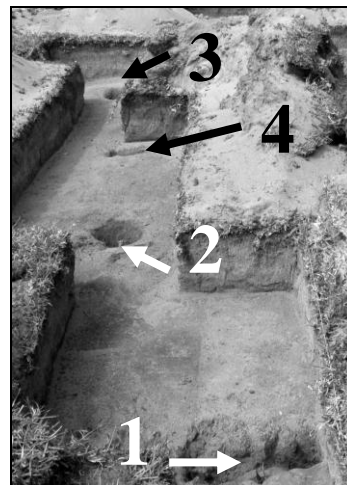


Figure 4.24: Northern edge of foundation (1), second (2) and first (3) major postholes with midway depression (4)

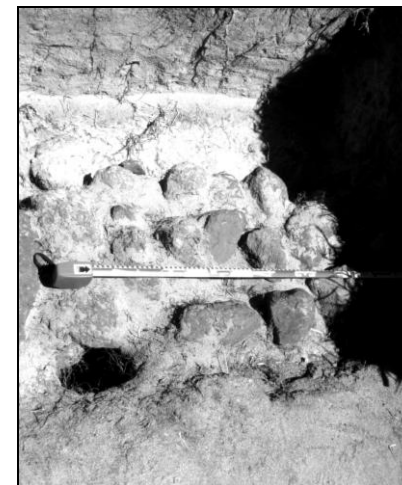


Figure 4.25: Concentration of even rocks in likely location of entryway

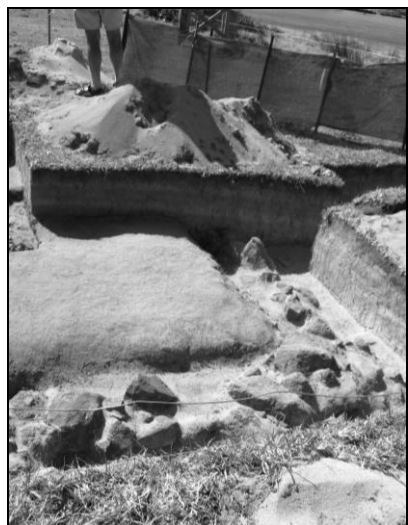


Figure 4.26: South-west corner of foundation



Figure 4.27: Discard zone extending south from southern edge of foundation



Figure 4.28: Large hand-cut calcarenite block situated next to entryway

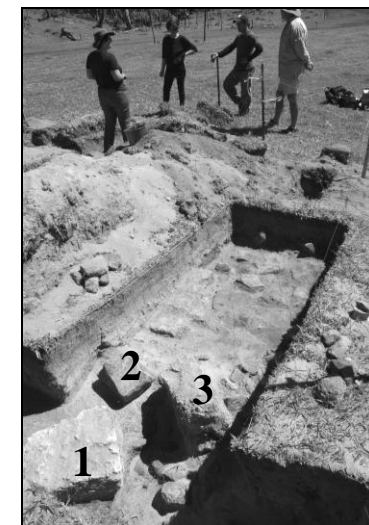


Figure 4.29: Three calcarenite blocks and hearth feature. Photo courtesy of Ian Hutton 2004

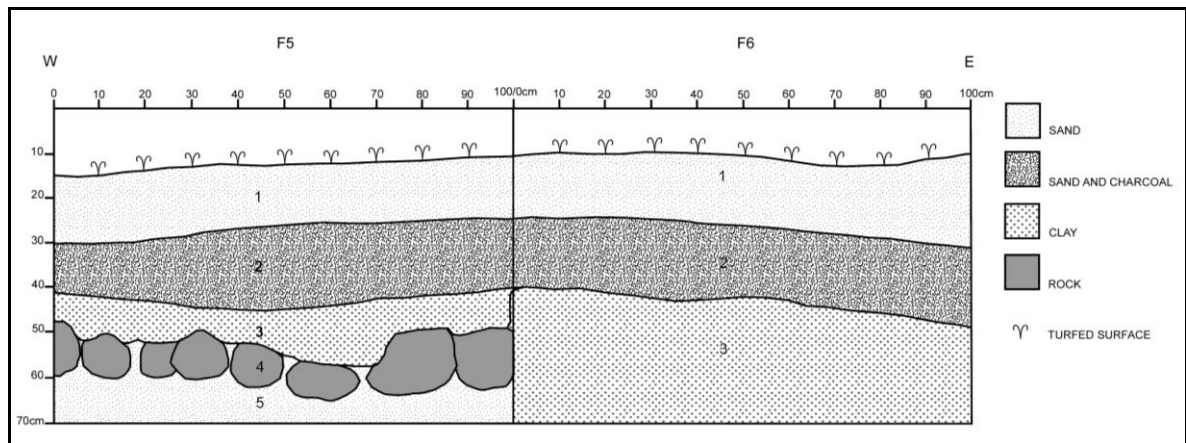


Figure 4.30: North face section of squares F5 and F6 showing the general feature labelling for the OSBF excavation

foundation clay surface was labelled feature three, the basalt cobbles comprising the rock underfloor being feature four and the sterile sand under the cobbles being feature five. Any cultural material recovered from the foundation surface were counted as being in feature three, any postholes were excavated as separate features, and sections beyond the margin of the foundation were excavated in spits until matrix containing semi conglomerated, white, sterile dune sand was encountered. Subsequent recording of sections revealed that feature two contained different concentrations of charcoal, and consequently feature two comprises two subsections, A and B (see Figures 4.31 and 4.32).

The foundation that was eventually revealed (Figure 4.33) is roughly rectangular and measured approximately 4 x 6m with a north-south orientation. An outer course of stone spaced from 10 to 20cm from the edge of the foundation, interspersed with medium sized post holes, would have served to keep walls made of palm thatch panels flush against the foundation edge and aid water drainage into the dune sand (Figure 4.26). One section of these stones on the western side of the floor were particularly even and tightly packed together, forming a properly cobbled section approximately 80cm long which most likely indicates the location of an entryway (Figure 4.25). Two large, deep, stone wedged, centralised post-holes and a small intervening depression suggest a central beam from which the roof was pitched to form a simple but sturdy single room hut (Figure 4.24), of a style similar to that shown in later photographs on LHI and relatively common in New Zealand and elsewhere in Polynesia (Figure 4.34). Charcoaled remains of small to medium sized lengths of wood interspersed with smaller, lineal fragments lying on parts of the floor surface further indicated the likely building fabric and suggest a fire either

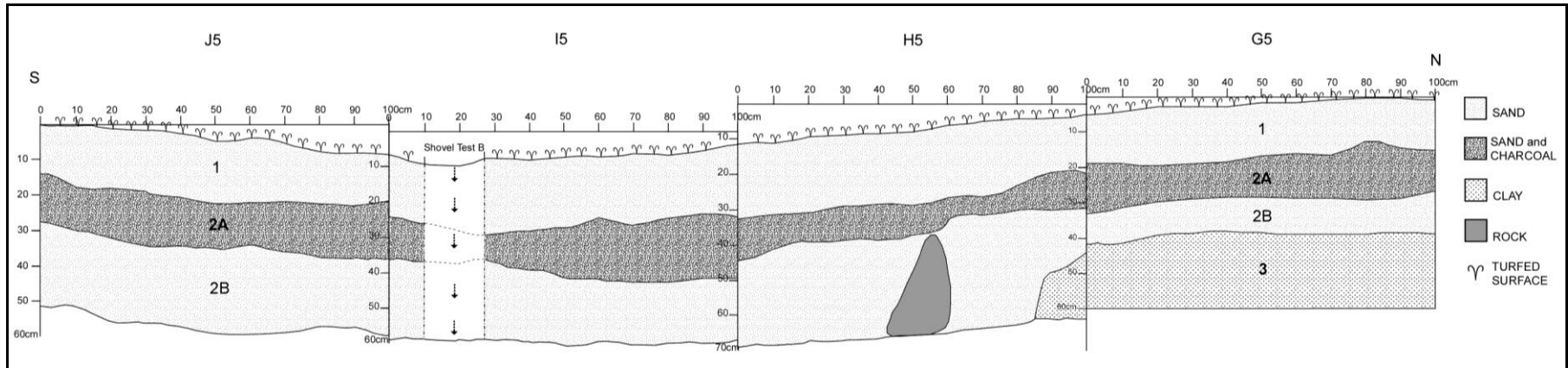


Figure 4.31: West face section of trench extending across four squares, showing the extension of feature two beyond the foundation squares, the two sub-section layers of feature two (A and B) and the correlation of the mound on the surface with the occurrence of the foundation and subsequent drop off.

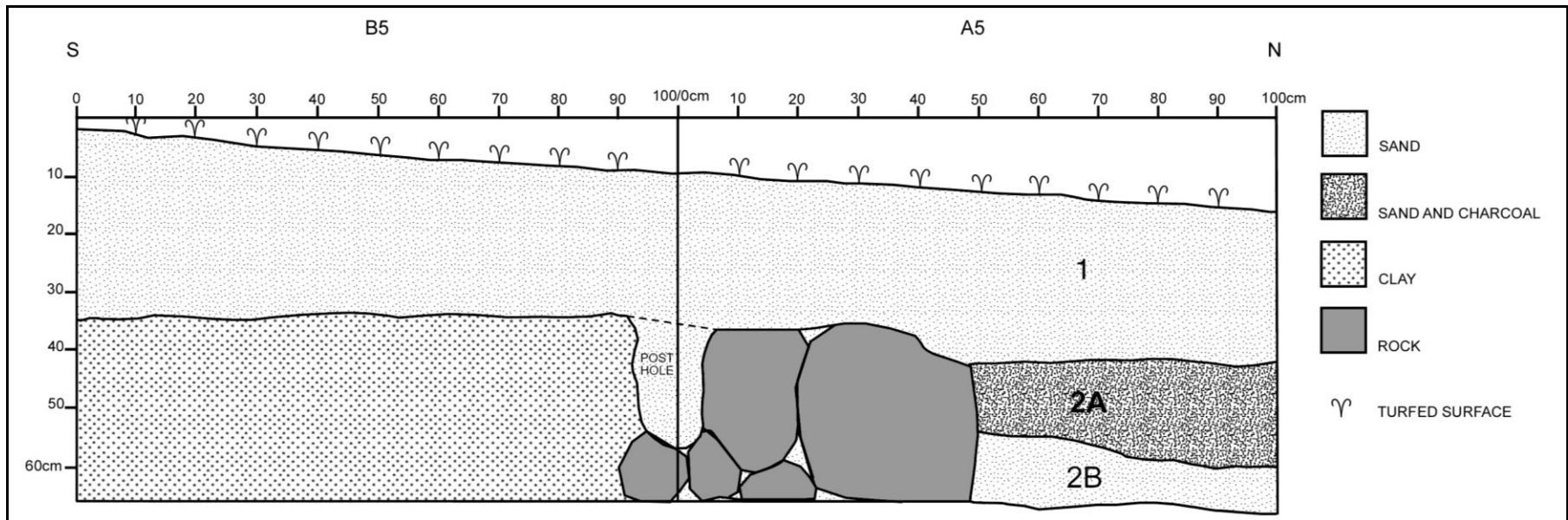


Figure 4.32: West face section of trench extending across two squares, showing a different edge configuration where a post hole occurs

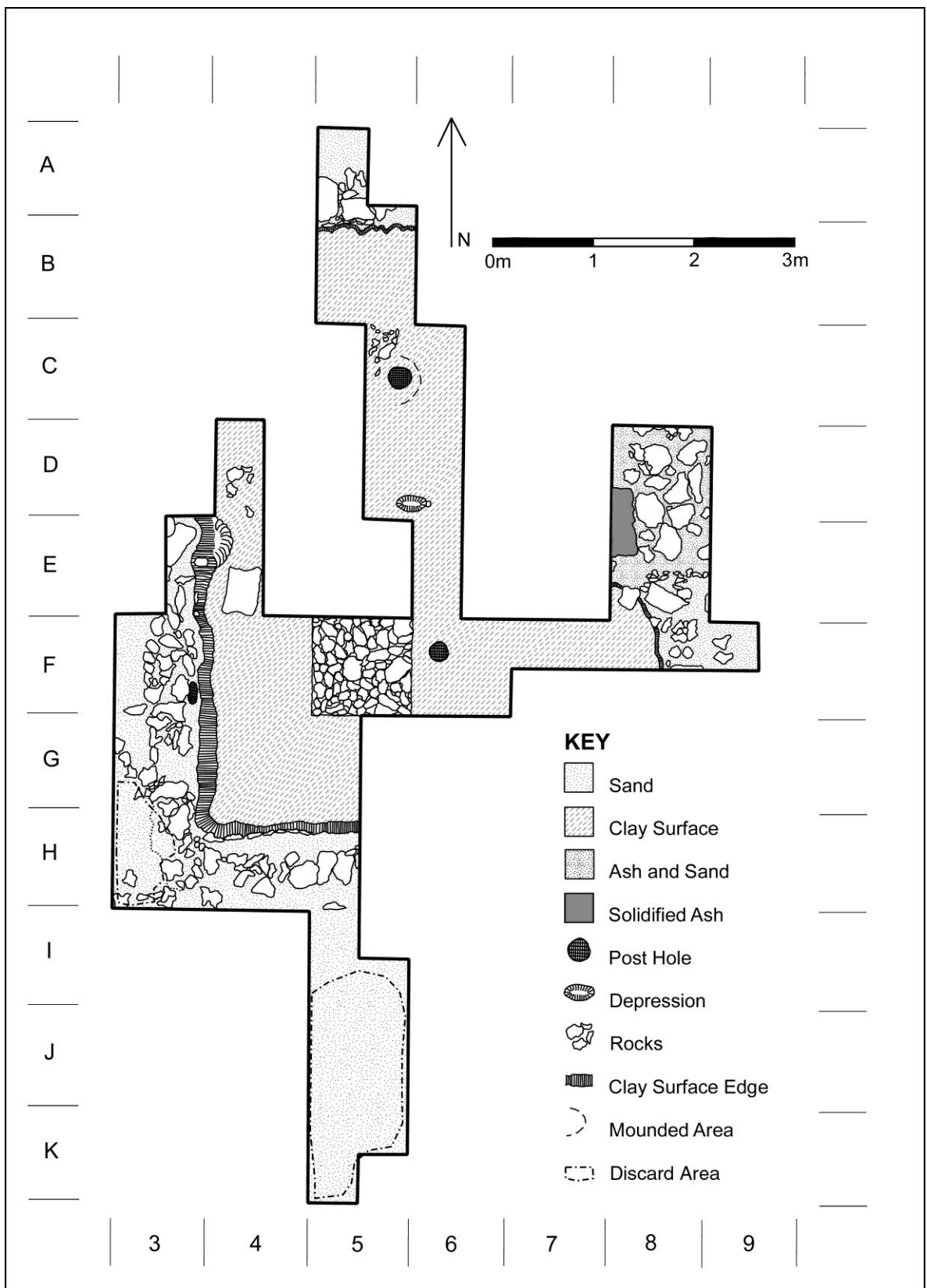


Figure 4.33: Complete extent of excavations on the Old Settlement Beach foreshore



Figure 4.34: Sharkey 1882 Palm thatch hut built in the ‘traditional’ LHI style in the 1860s.



Figure 4.35: LHI Smokehouse chimney containing calcarenite blocks, palm thatch and iron. ND. Courtesy of the Lord Howe Island Museum.

directly before or soon after abandonment as the structure was at least partially standing when burnt.

Located centrally in the east facing wall is a large, stone flagged area measuring *ca* 1.6 x 1.2m, which contains ash, charcoal and animal bone fragments, indicating some form of hearth structure for cooking and perhaps some heating despite LHI’s moderate climate. Adjacent to this hearth, three large, hand-cut calcarenite blocks were recovered, which are possible remnants of some form of chimney structure for the hearth (Figure 4.29; for another LHI example see Figure 4.35).

At least two likely discard zones were found adjacent to the foundation: one occurring 1.5m to the south between the house and the shore which contained a variety of glass, ceramic, metal and faunal material; and a second occurring directly around the south-west corner of the foundation and was comprised almost entirely of Pipi shells (*Plebidonax deltoides*) with a few exceptions. The majority of cultural material was recovered from these two zones, with some occasional finds on the living floor. Along with expected types of ceramic, glass, pipes, metals and buttons several economic species known from the historic record were noted.

In total, 3741 individual pieces of cultural material, weighing 7475 grams were recovered from approximately 10.42 cubic metres of yellow and charcoal stained sand matrix, including spade pits A and B. The occurrence of stratigraphic features were generally uniform across the site, with unstained sterile yellow sand merging into charcoal stained layers which consistently produced cultural material until reaching sterile white consolidated sand which forms the dune parent material. Soil samples from each identified layer were collected for pH analysis; clay samples from the foundation were gathered to determine the sediment source from any diatoms present; and large charcoal pieces from

the foundation surface and hearth feature were recovered for species identification of likely building materials and fuels.

North Bay

The abandoned domestic and farming sites at North Bay constitute the most northern settlements on the island, and sources indicate they were occupied in some form from the 1840s to at least the 1880s. These occupations appear to have been in two distinct locations and were occupied by at least three different family groups at different times. The date of complete abandonment of North Bay settlement is not known, but there was some agricultural activity still being undertaken in 1890s (see Figure 4.36) and unnamed leases are marked in the bay on a number of later cadastral maps until the declaration of the Permanent Park Preserve in 1952.

Several sources indicate that the earliest settlement in North Bay was established in the early 1840s with the arrival of Captain Middleton and his wife, who built a thatch hut and dug a well at the foot of Mt Eliza, which was named after Mrs Middleton (Edgecombe 1987; Nicholls 1952; Rabone 1940). It is not clear which side of Mt Eliza the Middletons

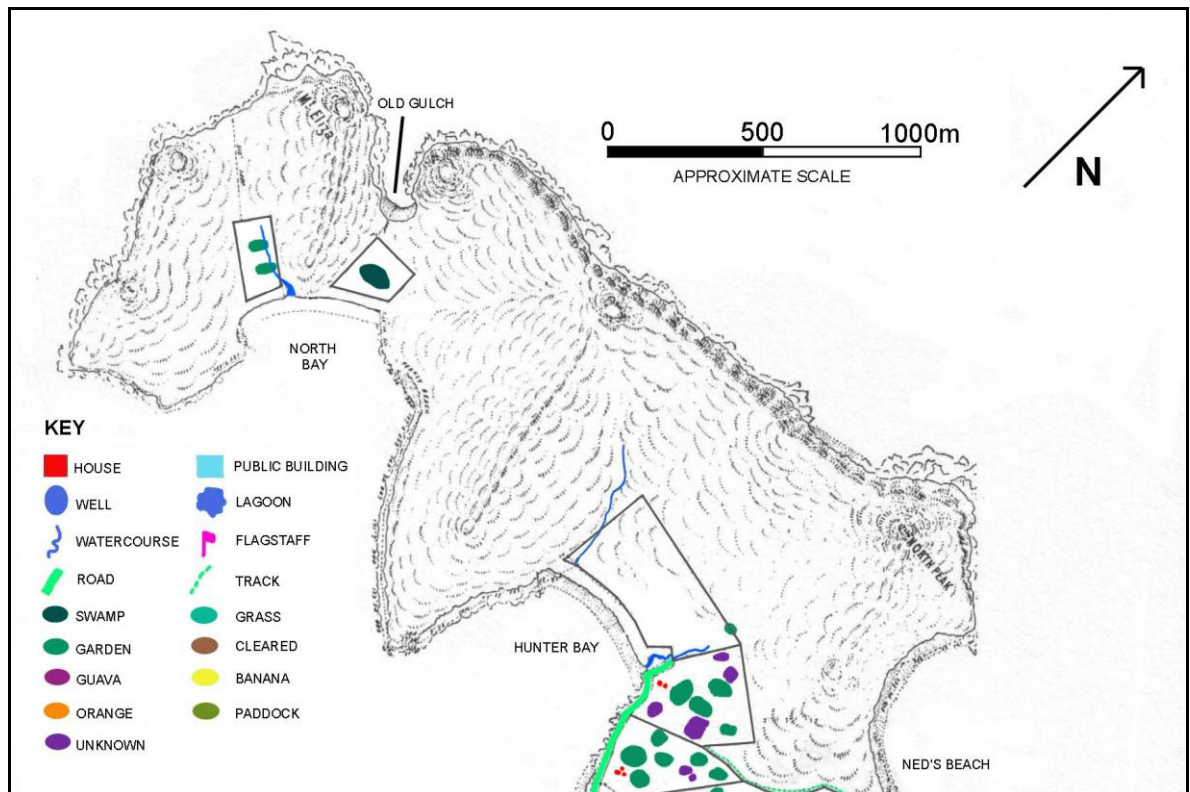


Figure 4.36: After Anon 1898 map. This map of LHI shows permissive occupancies and land use, including some crop types and well locations. Note the two gardens and swamp marked in North Bay

settled on, but Dr Foulis' 1851 map (see Figure 4.37) shows cleared land in North Bay to the eastern side of Mt Eliza. In 1855, the Middletons sold their interests to Captain Stevens who came to the island with his 10 year old son Campbell, and the Stevens were later joined by former African-American slave Perry Johnson, and a Maori known as Jackie Wahoo who both worked for the Stevens (Nicholls 1952; Rabone 1940). In 1856 Perry Johnson left for Sydney, returned with his fiancé Sarah and resettled at the foot of Mt Lidgbird. When the Stevens left North Bay is not clear, but sources indicate that Campbell Stevens (the son) left for New Zealand for educational purposes, and returned to LHI in 1868 (Rabone 1940). Campbell later became the island forester, special constable and postmaster and resided on a parcel of land in the main settlement area now known as Stevens' Reserve, and it is probable that he took up residence there upon his return in 1868, rather than at North Bay (Stevens 1892-1900; Rabone 1940). The third group to reside in North Bay appear to have settled on the western side of Mt Eliza, with the arrival of William Nichols in 1862 (Edgecombe 1987). Nichols built a palm-framed and thatched house with calico lining and split palm floor, and commenced farming in the bay by growing onions and other vegetables for trade (Edgecombe 1987). Nichols later exported fungus and beche-de-mer to China and collected and shipped native seeds and spores to the Royal Botanic Gardens in Sydney (Edgecombe 1987; Rabone 1940). In 1871 Nichols married a mainlander, Hannah Baker, who soon found life at North Bay very lonely and convinced William to move closer to the main settlement. Hannah's loneliness in the bay

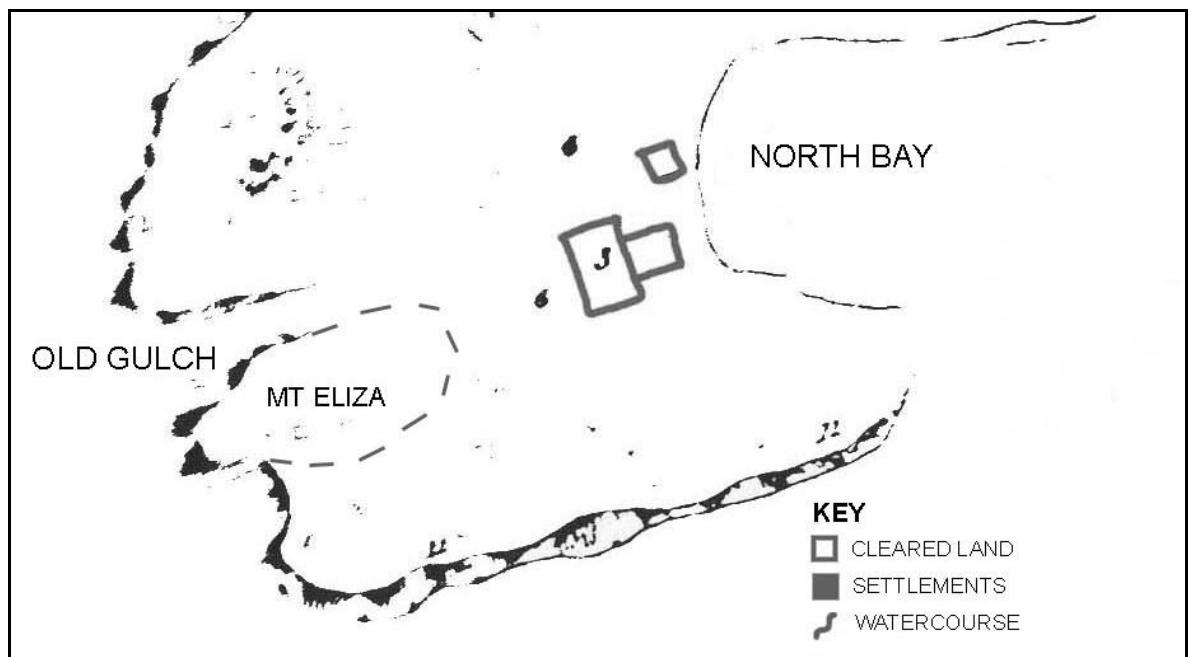


Figure 4.37: After Foulis' 1851 memory map of LHI in 1840s showing cleared land in North Bay

also indicates the absence of the earlier settler groups in North Bay by this time. The exact timing of the Nichols leaving North Bay is not known, only that some time after 1871 they moved to Old Settlement Beach where they built a new house and opened a shop in one room (Edgecombe 1987).

It is not clear whether the Nichols maintained their gardens at North Bay, but it appears that either they or an unknown group continued to do so until at least 1898, as the map clearly shows two areas marked as gardens in North Bay (see Figure 4.36). There appears to have been no residential occupation of the bay after the Nichols left, and the remoteness of the bay seems to have discouraged regular activity there since residential abandonment. Sources indicate that groups collecting palm seed visited the bay for a few days every year from the late 1890s (Stevens 1892-1900), and the bay was a popular place for islanders to camp, especially at Christmas and other official holidays throughout the 20th century as well as being a popular picnic destination for islanders and tourists during this time. Today the bay is periodically visited by bush walkers, fishermen and small snorkelling groups. Despite the extended period of regular visitors to the bay, the predicted impact to the Nichols' garden was minimal as it is only accessible by following an overgrown creek. The location of the Middleton/Stevens site being unknown was problematic, but large portions of the likely area are thickly vegetated and if the occupation was located in these areas the potential for disturbance was also likely to be minimal. The possibility of there being some evidence remaining was deemed worth investigating, as the potential search area was relatively small.

North Bay Ephemeral Swamp (3)

Preliminary Investigations

As mentioned above the exact location of the Middleton/Stevens occupation was not known, with the only indication being the cleared land shown on Dr Foulis' 1851 memory map. The distorted topography on the map made it difficult to pinpoint exact locations, however the map shows the clearings tending towards the front and eastern side of Old Gulch and Mt Eliza (see Figure 4.37). On inspection of the area in 2003, a small regular shaped ephemeral swamp was found, which had a small circular water-filled feature which may be the old well which Nicholls (1952) stated was still visible from the Middleton occupation in 1841 (see Figure 4.38). Consultation with a local informant revealed the past discovery of a glass bottle on the swamp margin by the informant, who



Figure 4.38: Water filled depressio



Figure 4.39: Amber case gin bottl

then supplied the bottle for inspection (see Figure 4.39). The bottle is an amber, case gin bottle dating between 1860 and 1930, and may coincide with the Middleton/Stevens occupation (Arnold 1997). No artefact scatters or surface features were apparent as the swamp is covered with a thick growth of mixed swamp grasses, including *Cyprus lucidus* and scattered stands of *Crinum asiaticum* (spider lily) (Thompson 2004). No other obvious signs of clearing were found in the vicinity, and the only vegetation of obvious human origin are two stands of mature Norfolk Pine trees that extend along the foreshore at both ends of the bay. Despite the lack of other obvious features, the occurrence of the well-sized depression and the known find of an artefact of contemporary age were suggestive enough of an association with the Middleton/Stevens occupation to warrant further investigation.

Survey and Ground Penetrating Radar Results

Upon revisiting the swamp area in 2004, the observations made in 2003 were confirmed, and a thorough pedestrian survey of the swamp and bay flat to the east of mount Eliza was undertaken to try and pinpoint the likely location of the Middleton/Stevens occupations. The survey of the eastern bay flat revealed that the actual area of level ground suitable for settlement is limited to the lagoon (south) side of the bay, which is mostly occupied by the swamp and modern picnic area (see Figure 4.40). The presence of any cleared or secondary re-growth areas could not be detected and random shovel tests in areas of flatter land confirmed the absence of any evidence of human activity outside the swamp and picnic area. The topography of the bay, with steep, rocky hills to the east and west and the precipitous Mt Eliza in the middle, means that this flat area is the basin for half of the North Bay catchment and consequently very little of the bay flat remains significantly dry throughout the year. The only consistently dry area appears to be the site of the modern

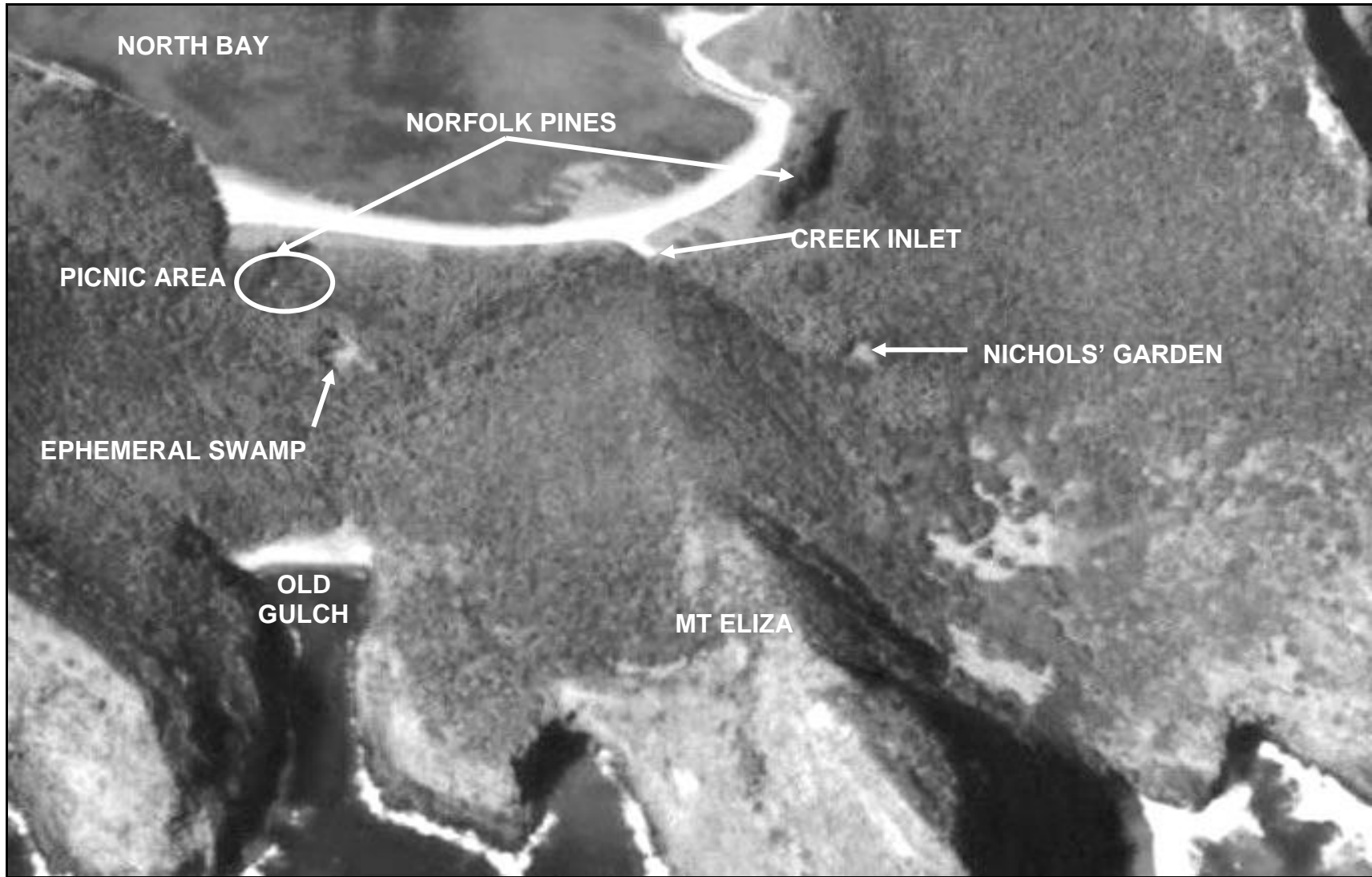


Figure 4.40: After 2001 oblique aerial photograph of North Bay, that clearly shows the ephemeral swamp, Nichols' garden and the creek inlet that leads to the garden. Courtesy of the Land and Property Information Unit, Sydney, New South Wales.

picnic area and its location between the swamp and the southern shore with its mature Norfolk pines make it highly likely that the picnic area and the site of the Middleton/Stevens occupation coincide. Modern building activity in the picnic area includes two shelter sheds, picnic tables and barbeques, maintenance shed, at least one old style long drop toilet and a modern composting long drop toilet and building which constitute significant subsurface disturbance. Surface observations in the vicinity did not reveal any obvious signs of earlier occupation eroding out of footpaths or in construction spoil heaps, however the likelihood of this being the site of the Middleton/Stevens occupation is still high.

The surface survey of the swamp did not reveal any discreet refuse areas that could be contemporary with these occupations, but rather occasional finds of whole and fragmentary glass bottles and ceramic shards dating from at least 1940s onwards spread at random intervals around the margin of the swamp. The survey did confirm the anomalous nature of the water filled depression previously recorded, and it now seems almost definite that this depression is the partly in-filled remains of the Middleton's well. A profile was undertaken to confirm the depth and nature of the depression (see Figure 4.41), but due to the overgrown nature of the area, and the previous GPS recording of the swamp and depression (see Figure 4.42), an additional dumpy survey was not undertaken as no new features were identified. A GPR survey of the area was attempted, but was completely unsuccessful due to the saturated nature of the swamp matrix, even though the swamp surface was currently dry. Following these surveys it appears that the likely location of the Middleton/Stevens occupations has been found, but the only significant evidence of these that is likely to remain is the well in the swamp.

North Bay Nichols' Garden (4)

Preliminary Investigations

The site of the Nichols occupation is more easily identified from the 1898 map (see Figure 4.36), which shows two garden sites located to the west of Mt Eliza, along the creek which several local informants confirmed were the Nichols' gardens. Investigation of the area revealed very thick native palm forest extending between Mt Eliza and the western most hills from immediately behind the first dune. Exploration further inland was only possible by following the overgrown creek bed extending along the foothills of Mt Eliza and eventually revealed one large and two small clearings at intervals in the forest to

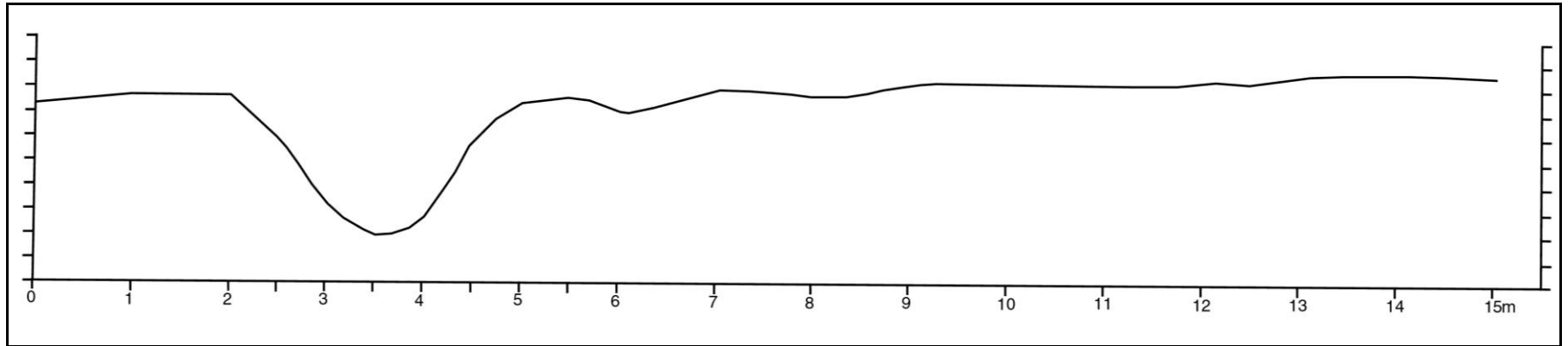


Figure 4.41: Profile of the round depression that occurs on the south-west margin of the North Bay ephemeral swamp

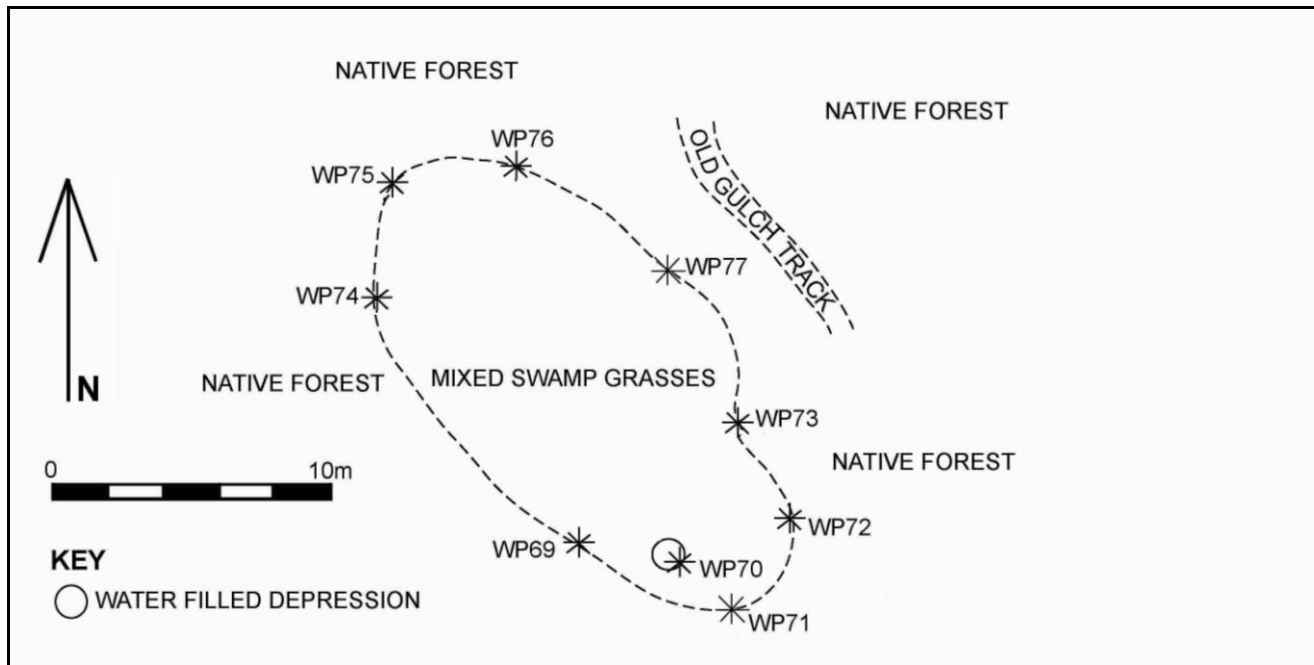


Figure 4.42: Original GPS survey of North Bay ephemeral swamp recorded November 2003

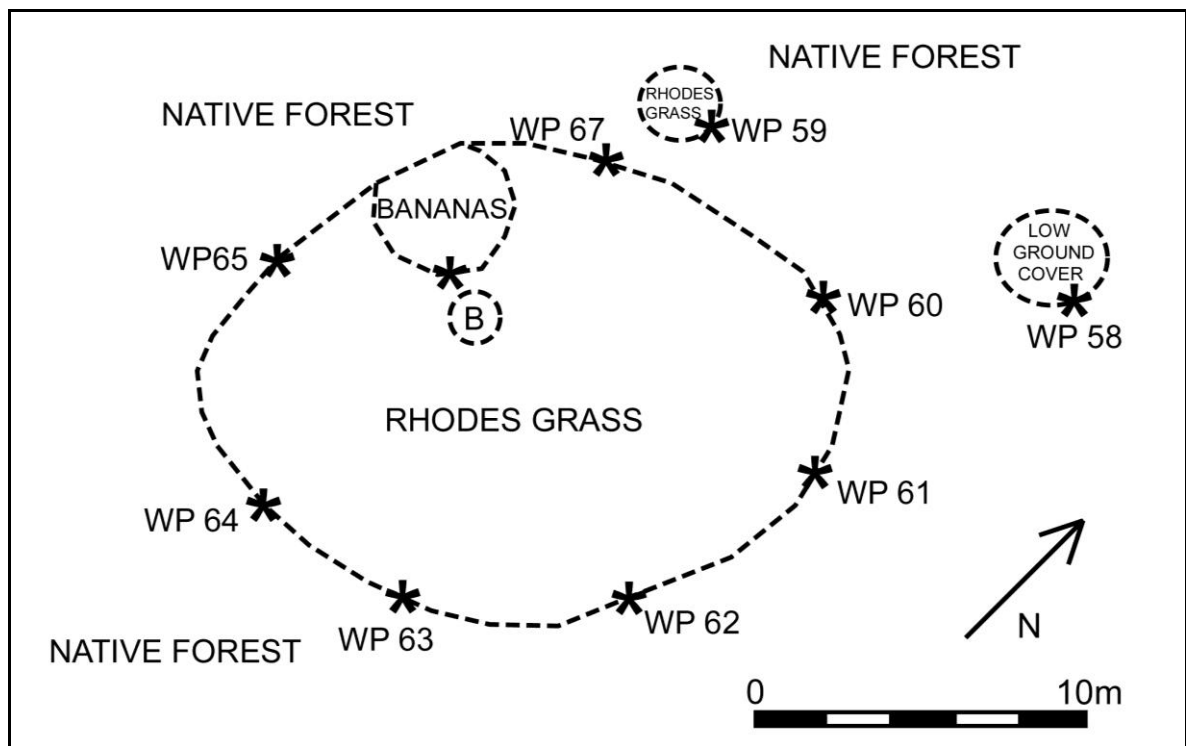


Figure 4.43: Original GPS survey of the Nichols' garden recorded in November 2003

the west of the creek (see Figure 4.43). The two smaller clearings varied slightly in size, and one in particular was very overgrown with species from the surrounding forest. The second small clearing adjoined the large and both were densely vegetated with exotic grasses, predominantly *Chloris gayana* (Rhodes Grass) (Thompson 2004). Revegetation appears to have been markedly slow in the large clearing, but it may have been due to the quick establishment of *C. gayana*, preventing the regrowth of native species. The large clearing is of a regular shape and has a substantial stand of bananas on its western edge, and due to the nature of bananas regenerative habit, it is possible that these trees date back to the Nichols occupation of the site. The small clearing adjoining the larger could be a possible house or shed site, and the second clearing may contain a similar site, but its association with the garden was not certain. Attempts to find the second garden clearing were abortive due to the impenetrable nature of the surrounding vegetation, and similarly the thick grass in the clearings prevented any observation of surface scatters or features. Despite this lack of obvious surface features, the site was clearly one of the Nichols' gardens marked on the 1898 map, and was likely to have several axillary sites located nearby. Due to the clearings being situated well away from any walking tracks in the midst of very thick native forest, the potential for human disturbance of the site was small. There

is a possibility of the area being used as a rest stop for seed collectors in the past, but their presence was thought to have had minimal impact.

Survey and Ground Penetrating Radar Results

Upon reinvestigation of the Nichols' garden in 2004, two of the three previously recorded clearings were found to be unlikely candidates for further investigation. The two small clearings noted previously, had within the space of nine months significantly regenerated, indicating that their presence is more likely due to natural, recent canopy loss. A thorough investigation of the western bay flat also located the second garden clearing marked on the 1898 map, which was almost completely overgrown. The extent of regeneration on this once significant clearing further confirms that any smaller contemporary clearings of the size of those recorded in 2003, would have been completely reclaimed by the native forest many years ago. This second clearing, given its size would most definitely be a second possibility for investigation, however it is almost completely re-vegetated by native species and as it is within the bounds of the Permanent Park Preserve, special arrangements would have to be made for any clearing to allow survey and possible excavation which as discussed earlier is outside the scope of the project. Indeed, the clearing was so densely vegetated survey via GPS was impossible as sufficient reception was not attainable. Observational estimates place it approximately 100m north-east of the first recorded garden clearing, and it appears to have been of a similar size and shape, as indicated by the 1898 map. The state of the second clearing, makes the comparatively cleared nature of the first garden site intriguing, despite the smothering nature of the *C. gayana*. Community consultation revealed that a Nichols descendant regularly travelled by foot across to the bay and continued to garden on the site until at least WWII, which would also explain more satisfactorily the presence of bananas (Sainsbury 2004; Thompson 2004).

Mechanical and hand clearance of the *C. gayana* revealed a level area of land bisected by a shallow, almost completely silted up channel that led to a tributary of the main creek to the east of the clearing margin (see Figure 4.44). A profile was extended across the channel, and along the length of the clearing to measure the depth of the channel and test the ground level of the garden area (see Figure 4.45). In the profile, the channel is not apparent at all, and is in fact really only indicated by the small dip at 13m which indicates the northern edge of the channel and the small dip at 10m indicating the

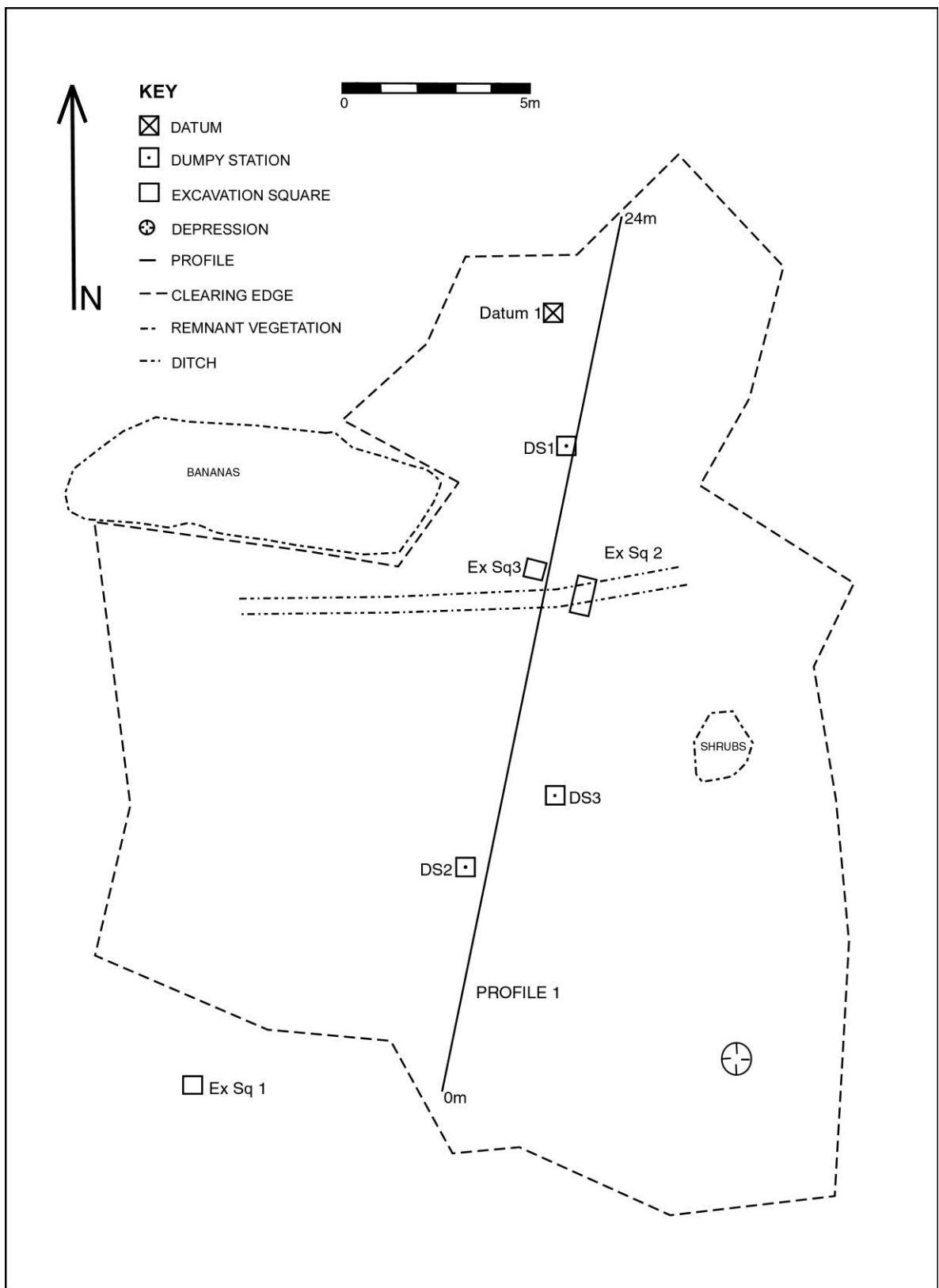


Figure 4.44: North Bay Nichols' garden survey

southern edge. The intervening land does not dip, which is contrary to the appearance of the 'channel' to the naked eye. The whole channel appears to be a naturally occurring channel across the garden along which water passes during large rain events. Probes of the matrix in the 'bottom' of the channel confirmed its role as drainage as the soil was noticeably wetter than earth dug up elsewhere on the site. The only other discernable feature was a large, shallow depression in the south-east corner, which seems to be a natural variation in the ground surface as test probe revealed nothing of significance. Attempts to undertake a GPR survey were unsuccessful as the soil matrix of the garden was wet due to recent rains and the garden area occurring in the basin for the western half of the North Bay catchment (see Figure 4.40).

Excavation Results

Following the clearing of the site and survey, it was decided to test a likely domestic occupation site to the south-west outside the clearing margin. The pedestrian survey undertaken throughout the western bay flat failed to find any likely locations for domestic occupation in the bay, and even in the immediate environs of the garden clearings, few places were suitably level or well drained to be likely spots for a house. A large, mature tree to the immediate south of clearing afforded a small but appropriate area of flat ground free of vegetation and water run off that could have been a suitable location of either a house or auxiliary building such as a shed, and so a 50 x 50cm excavation square was put in to test the possibility. Excavated in arbitrary 5cm spits, the square proved to be completely sterile through four spits of soil matrix that was identical in colour and pH throughout. Increasing root incursions and lack of cultural evidence led to the closing of the first test pit (see Figure 4.46). A second test pit was extended across the 'channel' in the middle of the clearing in an effort to find evidence of its possible construction or natural development and subsequent silting, and any possible cultural material that may have been washed in from across the site. Square two was a 1 x 0.5m trench that ran completely across the 'channel'. Excavated in four, 5cm spits square two revealed the same identical soil matrix as square one (see Figure 4.47). No cultural material or sedimentary clues to the past nature of the channel were revealed, indicating that the channel is probably of the same magnitude it has been for many years and rates of silting on the site are slow.

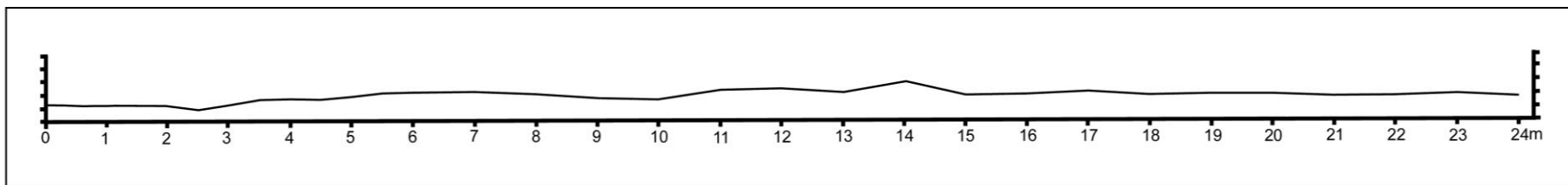


Figure 4.45: North Bay Nichols' garden profile showing relatively level ground surface and the 'channel' edges at 10 and 13 m.



Figure 4.46: Square one end levels



Figure 4.47: Square two end levels

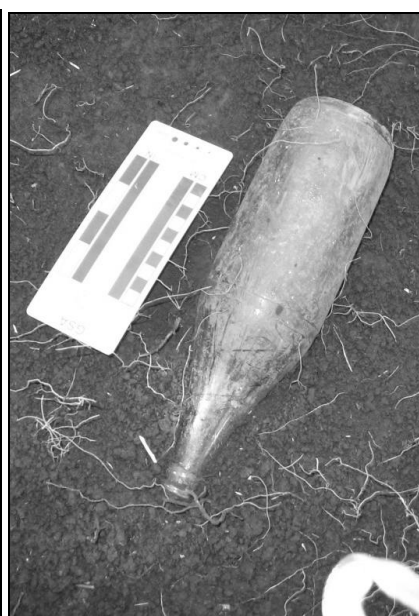


Figure 4.48: Bottle found in square three



Figure 4.49: Square three end levels

Probing across the site failed to turn up any cultural material or more likely spots to investigate, with one exception. The very edge of a buried glass bottle was found to the north-west of square two, and despite its unlikely position for a refuse area, it was excavated as a 50 x 50cm square to assess its potential. The bottle was revealed within the first five centimetre spit, and was found to be a NSW Bottle Co clear glass bottle with a moulded base date of 1946 (see Figure 4.48). Excavation continued for another two spits to ascertain whether it was in fact a disposal site, but was completely sterile and produced the same soil matrix found in the other two squares (see Figure 4.49). The presence of the bottle indicates visitation to the site after WWII and may be an indicator of either continued gardening in the area, or the use of the site as a picnic spot for palm seed collectors. The accumulation of approximately 5cm of sediment in roughly 50 years gives a fairly good indication that any cultural material from the likely 1898 activity should be expected within the third spit, and any material from the Nichols occupation from the third and fourth five centimetre spits. As time and resources were limited, it was decided to close investigations at the Nichols' garden, with a view to revisiting it if time and resources permitted after the investigation of other sites on the island.

The apparent lack of material of an appropriate age from any of the squares is very puzzling, and it is not felt to be a conclusive indication of the likely remains associated with the Nichols' garden. The current outcomes are most likely a result of random and necessarily limited sampling coupled with the inability to conduct a GPR survey and difficulty in locating likely investigation spots around the margin of the clearing and elsewhere in the bay. Unfortunately the Nichols' garden question could not be revisited during this project, but current results do not conclusively indicate the lack or presence of archaeological remains.

The South End

Wright/King Land (5)

Following Poole and Dawson's take over of Ashdown, Bishop and Chapman's interests on LHI in 1841, the community expanded with Poole and Dawson employing the Wright, Hescott and McAuliffe families to continue the supplying trade (Edgecombe 1987; Nicholls 1952; Rabone 1940). When Poole, Dawson and Foulis failed to get land leases from the New South Wales government in 1847 and they decided to abandon their business venture on LHI, their employees were given the option to leave or stay on as independent

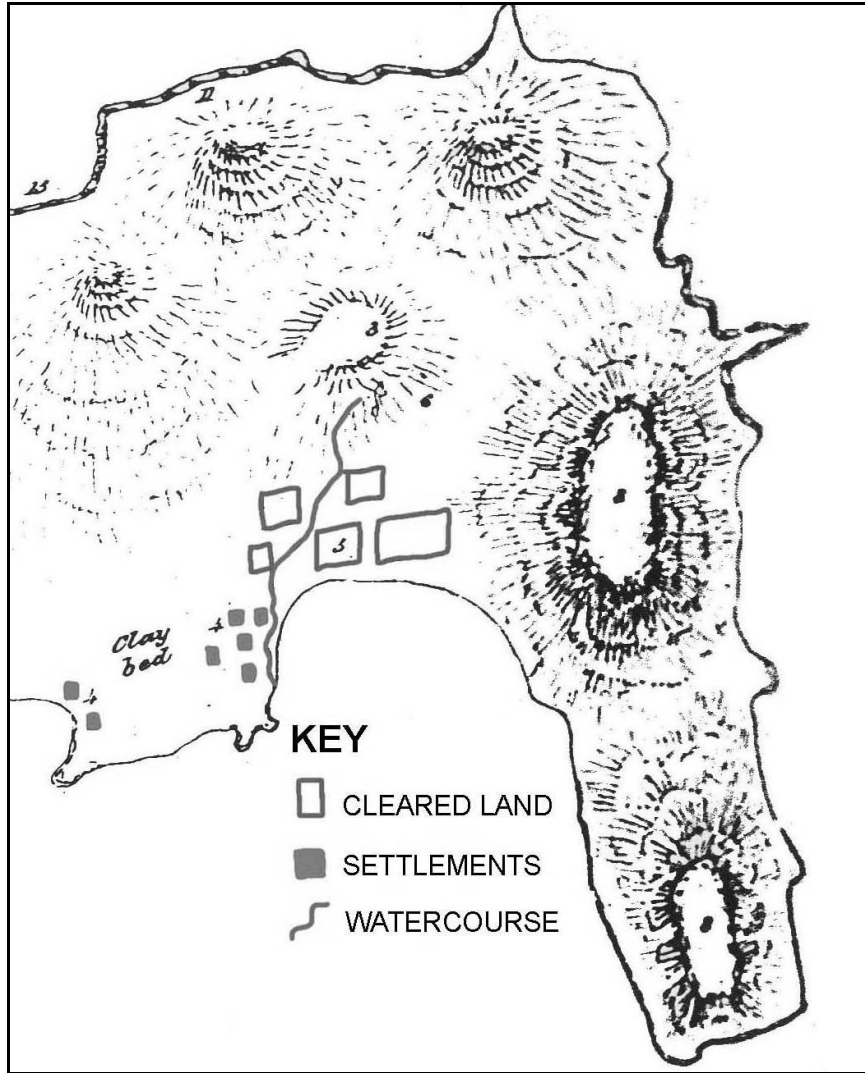


Figure 4.50: After Foulis' 1851 memory map showing cleared land and 'settlements' in the Soldier's Creek basin at the southern end of LHI.

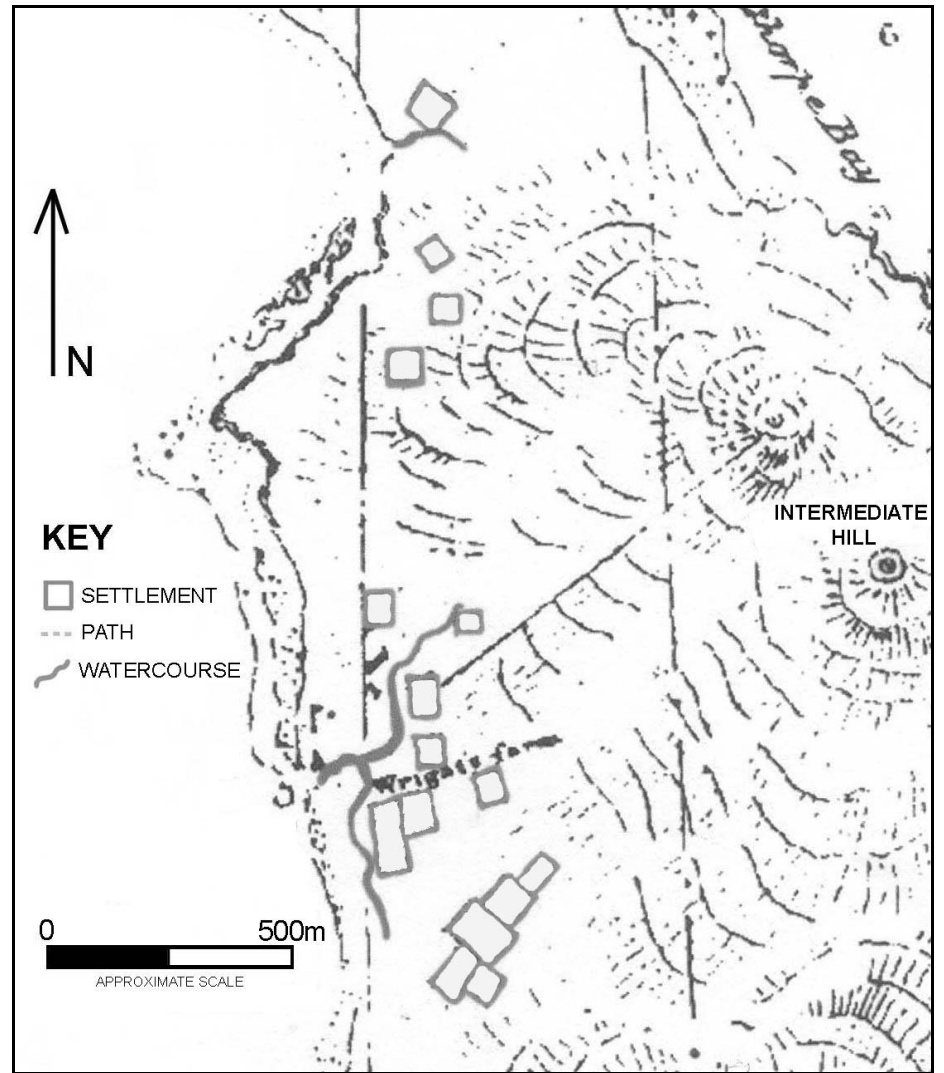


Figure 4.51: After Denham's 1853 map showing 'settlement' in the Soldier's Creek basin attributed to the Wright family.

settlers. Three family groups chose to stay; the Wrights, Andrews and Moseleys, who were engaged in a farming partnership working land in the Soldier's Creek basin at the southern end of LHI at the foot of Mt Lidgbird (Rabone 1940). The partnership dissolved in 1848, and the Andrews and Moseleys moved north to settle their own land, while the Wrights continued where they were. Foulis' 1851 map (Figure 4.50) and Denham's 1853 map (Figure 4.51) show considerable activity around the Soldiers Creek area and Denham labels the areas as being worked by the Wrights. The Wrights appear to have left the island around 1862, leaving the farm in the care of Charles Thorngrave and Edward (Ned) King. Thorngrave also left at some point, leaving the farm to King, whose descendents still occupy the lease today (Rabone 1940). During the 162 years of occupation on the Wright/King farm, the amount of associated features was expected to be high, with many instances of older features being built on or highly disturbed by modern occupation. An area known as 'The Rose Garden' was identified which appeared to contain a likely house site dating from the earlier phases of settlement on the lease and according to the current leaseholder was a likely location of one of his great grandfather's houses.

From local information and historic sources it seems the 'Rose Garden' was the likely site of a house occupied from the 1850s to the 1870s when a new residence was built closer to the shore. The Denham map does not clearly denote dwelling locations, but written sources suggest that this is indeed the site of one of the earliest dwellings in the area as it is situated directly at the foot of Mt Lidgbird and in close proximity to Soldiers Creek (Rabone 1940). Other evidence suggests that such a house was empty but extant and habitable in 1876, as R.D. Fitzgerald wrote during a short term visit: "...we accepted the kind offer of my old guide Ned King and took possession of an unoccupied house of his at the foot of the mountain" (Finch and Finch 1967). By 1898 all remains of the dwelling are likely to have disappeared as the 1898 map does show very clearly the locations houses and the only dwellings shown on the map (see Figure 4.52) is the later house built in the 1890s which is partially extant today.

Preliminary Investigations

The site consisted of a defined area of remnant vegetation from a flower garden, which has been fenced off for some years to prevent cattle trampling, and a series of hand dug ditches running along the southern and western edge of the site which bounded a flat, well drained elevated area to the west of the garden (see Figure 4.53). The garden

vegetation consisted of several substantial stands of *Agapanthus*, four semi-mature fig (*Ficus*) trees, a few semi mature kentia palms (*Howea forsteri*) and a small group of rose (*Rosa*) shrubs interspersed with thick grass and weed species such as thistle (*Cynara cardunculus*) and *lantana*. The area surrounding the fenced area is covered with the same grass species and has a scattering of kentia palms. The ditches on the southern and western margins are on average 60 to 80cm deep, and despite being considerably silted up continue

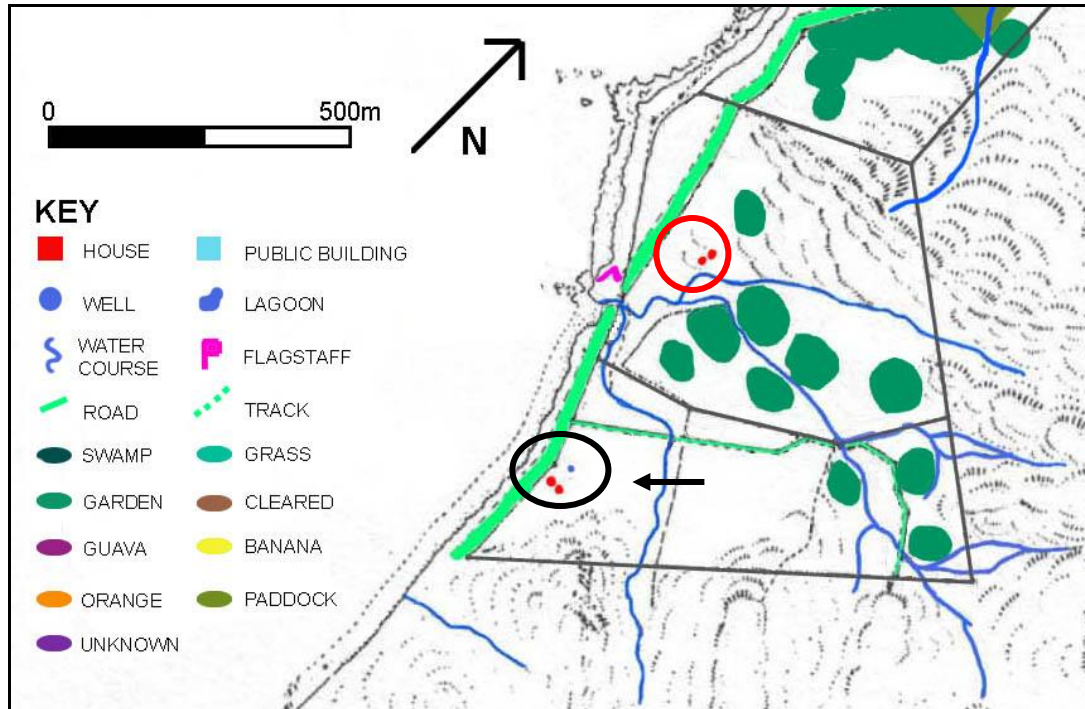


Figure 4.52: After Anon 1898 map showing two structures and a well (all extant) on the King’s lease (circled in black). The arrow indicates the approximate position of the ‘Rose Garden’ in relation. The red circle indicates the Johnson’s house site (see Perry Johnson Land section).

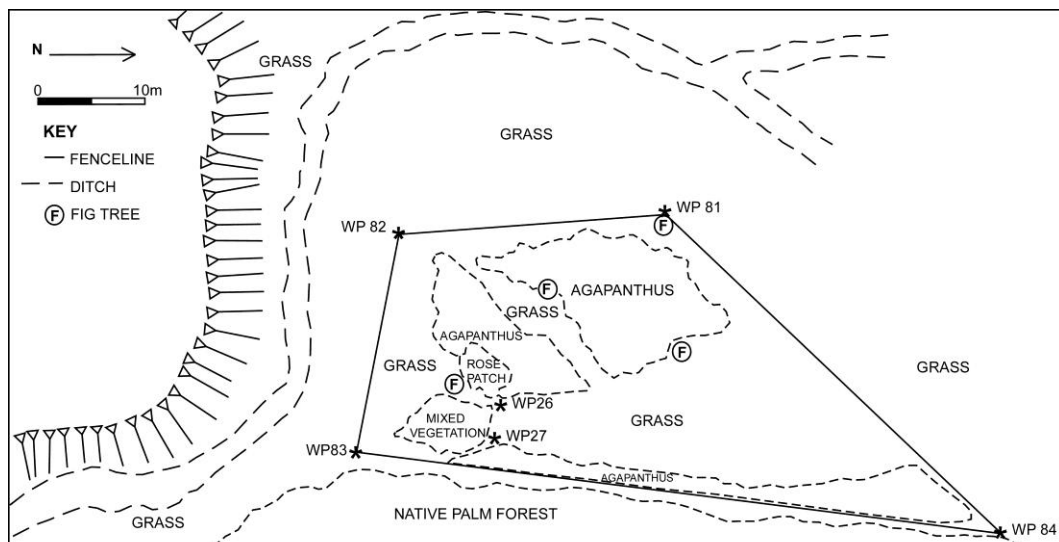


Figure 4.53: 2003 GPS survey of the ‘Rose Garden’

to successfully divert run-off from the mountain directly behind into Soldiers creek. At the northern end of the ditches, remnant oleander (*Nerium oleander*) bushes remain on the both banks, and continue intermittently until the ditches reach the main creek catchment. A well located directly across the modern road from the site is still in use and appears to be the same one marked on the 1898 map and likely to have serviced any house that stood in the 'Rose Garden' area. Due to the thick cover of pasture grass the identification of surface scatters or other surface features was not possible, but the remnant vegetation in the fenced area possibly offered some clues.

Towards the eastern side of the enclosure, there is a large strip of grass that does not include any other established vegetation and is of ample size to accommodate a dwelling or auxiliary building. Further, from the western edge of this grass strip there is a definite grassed break extending between two well-established stands of *Agapanthus*, which may indicate the location of a formal path through the garden. This possible pathway may have been made of stone or brick at one time, discouraging the encroachment of *Agapanthus*, but probing in the area for compact material was inconclusive. Despite the possibility of the garden not being maintained for over a hundred years, the plant species that are evident are capable of continued growth and regeneration over many years given the right conditions. Certain species of fig and rose are known to flourish for hundreds of years, and *Agapanthus*' rhizome regeneration allows it to keep growing in the same area with gradual spread over time. LHI's equitable climate with its frequent and moderate rainfall year round is very conducive to the growth of many domesticated floral species without human intervention and coupled with the long lived species evident today makes the probability of the garden remnants dating from at least 1876 quite high.

During the early years of abandonment there is a possibility of legitimate and furtive scavenging from the site for building materials, however occupational debris is unlikely to have been significantly disturbed, particularly privy and dump-sites. The modern alignment of Lagoon road passes within 30m of the site, but as it is not overtly obvious as a place of interest, the likelihood of casual investigation and disturbance of the site is low. As the site is situated at the foot of Mt Lidgbird and is within the Soldiers Creek catchment, there ordinarily would be potential for significant flooding of the area, however the silted up ditches on the margin continue to divert considerable volumes of water around the site and significantly reduce any water disturbance or erosion of the site.

Survey and Ground Penetrating Radar Results

An additional pedestrian survey of the area in 2004 largely confirmed previous observations of the general nature of the site and remnant vegetation and the well drained aspect of the land immediately to the west. The area in general was much wetter than during the previous visit and this helped demonstrate the effectiveness of the hand cut channels in diverting water from the site. The only exception was the grassed area inside the fenced off garden, which upon re-examination was found to be lower lying than the remainder of the garden and retained a significant amount of standing water. The poor drainage of this particular spot makes it an unlikely position for a dwelling or auxiliary building, but the layout of vegetation around it is perhaps still suggestive of something being there in the past. Probes of the area produced nothing of interest, and further investigations were prevented by the presence of standing water for the duration. The garden area, while having a new crop of weeds, retained the remnant garden species previously recorded and due to its overgrown state, an additional dumpy survey was not possible or needed in the garden. A survey of the surrounds (see Figure 4.54) confirmed the previously recorded features and included all the accessible drainage features and remnant oleander on the larger site. A substantial and likely man-made basalt cobble retaining feature was identified along the northern edge of the high, well drained land, separating it from the lower wetter land. The feature is significantly overgrown and silted up, indicating it is likely to be of a considerable age. Local informants confirm the newly recorded ditches are mostly contemporary with the previously recorded ones, with occasional modern modifications such as the long straight ditch at the northern border that coincides with the modern road alignment. Two profiles were done to measure the depth of the ditches, measure the level of the high, drained land to the west of the garden and to gauge the height difference of this land to the wetter drainage basin below (see Figures 4.55 and 4.56).

Due to the overgrown and waterlogged nature of the garden and saturated ground to the north of the garden and basalt cobble slope, GPR surveys were only possible on the area bounded by the western garden fence line, the cobble slope and the south and east portion of ditch. Long runs were conducted in north-south and east-west lines at several intervals across the whole area, but produced ambiguous results. Some runs were hampered by palm tree deadfall, but the general picture of the area from the GPR was unremarkable. Small anomalies that did show up were ground tested and were usually found to be buried basalt

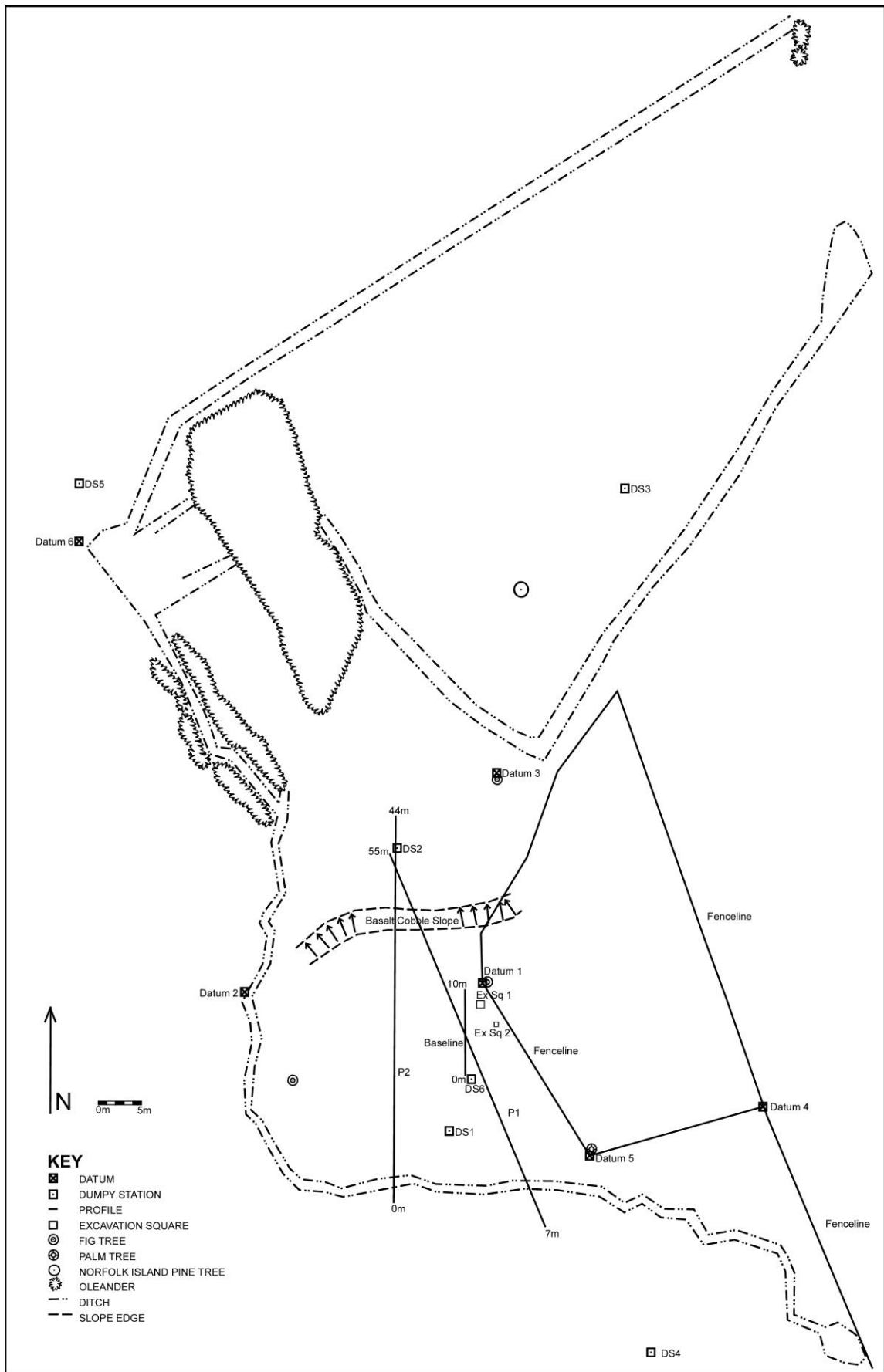


Figure 4.54: 2004 survey of the land immediately surrounding the ‘Rose Garden’.

boulders or old palm root masses. Despite the ambiguous and generally unhelpful GPR results, test excavations were undertaken, as the site seemed a prime and discrete area of likely occupation.

Excavation Results

Based on proximity to the garden area, the basalt cobble edge and slight variations in the level of the surface, a 1 x 1m test square was positioned to test for any evidence of human activity. Excavated in arbitrary 5cm spits, the square proved to be completely sterile throughout three spits of identical soil matrix, and due to its unproductiveness and increasing large rock incursions (see Figure 4.57), it was abandoned. A second test square measuring 50 x 50cm was positioned in another slight surface anomaly and also produced nil cultural material throughout three 5cm spits (see Figure 4.58). Interestingly it did not reveal as much rock as the first square, but it did contain the same soil matrix, and the proximity of the first square to the cobbled edge may explain its larger amount of rock. Probes were done in the area in an effort to locate any further locales of excavation potential, but produced no immediate results. Despite the lack of any cultural material from the test excavations, there still seems to be too many features in the vicinity indicating at least some kind of structure on the site, if not a dwelling. The remnant oleander, which has a long history as a commonly planted wind break for buildings and crops (Maiden 1898) at least indicates past crop growing activity on the lower areas to the north of the garden and raised land. Despite the considerable labour invested in draining the area, much of the land is saturated for several days after any sizeable rainfall, making it a suitably sheltered and irrigated basin for the cultivation of taro and other thirsty crops. Taro has been a recorded crop on LHI since the first settlement in 1834 which was grown until at least 1882, but was no longer cultivated by 1898 (Clarson 1882; Maiden 1898; White 1835).

The presence of flower garden species in the middle of an otherwise ordinary cattle pasture, the time and labour invested in draining and shoring up a sizeable area of level land adjacent and an equal amount of labour involved in the creation of a suitable crop growing area all in conjunction are too obvious to ignore, so the current negative results are puzzling. A larger sampling program would be required to satisfactorily resolve the questions raised by the features in this area and as with the other sites, further investment of time and resources were reserved for possible re-examination after the completion of

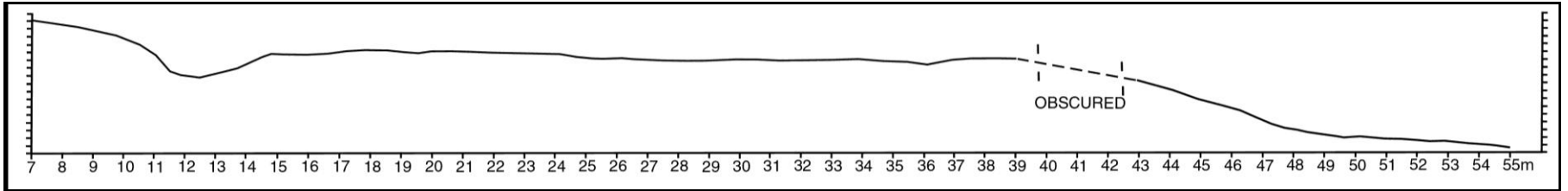


Figure 4.55: Wright/King land profile 1

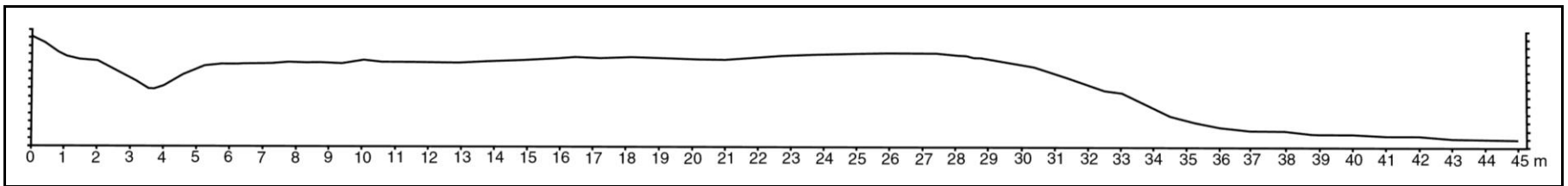


Figure 4.56: Wright/King land profile 2



Figure 4.57: Excavation square 1 end levels



Figure 4.58: Excavation square 2 end levels

investigations at the remaining sites. Unfortunately the Wright/King land site could not be re-investigated, but as with the North Bay Nichols' garden site the lack of subsurface features is not considered to be conclusive.

Perry Johnson's Land (6)

In 1855 Perry Johnson, an African-American crewman on the whaler *Will o' the Wisp*, left ship life and settled on LHI in North Bay with Captain Stevens and his son. The following year Perry went to Sydney where he met Sarah, a South African nurse and governess and on their return they were married by Captain Field and settled near the foot of Mt Lidgbird (Edgecombe 1987; Nicholls 1952; Rabone 1940). The Johnsons farmed a large parcel of land adjacent to Soldiers Creek, and Perry excavated a complex series of deep ditches to drain his land. This technique was quickly adopted by his neighbour Ned King, who most likely dug the ditches evident at the Rose Garden site, and similar ditches in the vicinity (Birmingham 1984; Edgecombe 1987; Rabone 1940). Perry and Sarah dwelt for at least 20 years in a typical LHI palm thatch hut as shown in an 1882 photograph taken during the visit of commissioner Bowie-Wilson (see Figures 4.59 and 4.60). The Johnsons' property was often a locale of community activity: "Hunters and seed collectors knew that, if they fired a gun from Smoking Tree...Mrs Johnson would have the kettle boiling and a cup of tea ready when they arrived" (Nicholls 1952:27). At various times the Johnsons had tenants with them: the Searle family (including 10 children) arrived in the mid 1860s and stayed for a short period with the Johnsons before leaving; in 1873 Henry Wilson arrived and dwelled in a thatch hut near the Johnsons' until at least 1895; and in the early 1890s Edmund Jeune and Celine Moore with their two children dwelled for a time somewhere on the Johnson's land, Edmund labouring in their gardens in exchange for a portion of land on which to build a house and a third share in the Johnson's crop (New South Wales Legislative Assembly 1890; New South Wales Legislative Assembly 1895; Nicholls 1952; Nichols 2006; Stevens 1892-1900). The Johnsons remained on their land until Perry's death in 1915 and Sarah's death in 1918, at which time the land appears to have been gifted to Ellen Fenton, who had lived next to the Johnsons on their land for sometime prior to their deaths, acting as a housemaid and possibly nurse or carer during their later years (Fenton 2004). Throughout their 60 year occupation of the site, it appears that the Johnson's house remained on the original site, but whether their thatch house of 1882 was replaced with a more modern timber and/or iron structure is not clear. Similarly, what

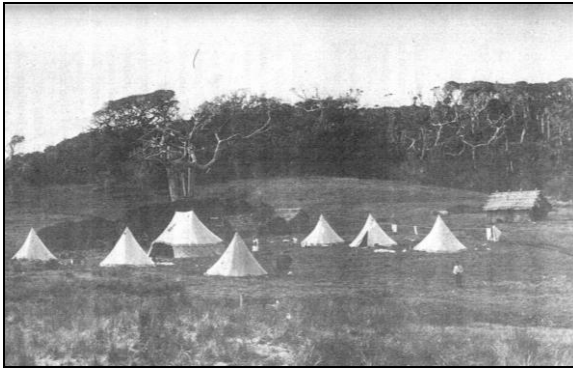


Figure 4.59: Sharkey 1882. The Commissioners camp on the Johnson's land. Note the Johnson's thatch house in the background



Figure 4.60: Sharkey 1882. The Johnson's original palm thatch house, with Mrs Johnson standing outside with a bullock

happened to the house following their deaths is not clear, but it is probable that it was utilised by the Fenton's for a period, who dwelt in two houses adjacent to the Johnson's house, one of which was the current leaseholder's childhood home. All three houses have now disappeared, and again the timing of the eventual decay of these dwellings is not clear, but surface evidence of their presence remains. Birmingham also observed this: "...the site of Johnson's former house and garden is still clearly identifiable from the network of ditches he excavated to drain the boggy land" (Birmingham 1984:4).

Preliminary Investigations

These ditches were still in evidence in 2003, in addition to a well that is still in current use which has been ascribed by local informants to the Johnson's occupation. Local knowledge extends to an approximate idea of the location of the Johnson's house (Fenton 2003, 2004; Shick 2004) which coincides with the dwelling marked on the 1898 map (see Figure 4.52), and this area was inspected and recorded in 2003 as a surface feature consisting of a series of regular shaped depressions that form a rectangular shape approximately 6 x 8m, and a second flattened, rectangular area to the east measuring approximately 2 x 4m (see Figure 4.61). These rectangular features may be indicative of a house and a detached kitchen or perhaps a shed despite the relatively small areas of both features. Situated in an open paddock grazed by about 20 cattle, the site is located on the flattened crest of a small hill overlooking a boggy area immediately to the east and pasture to the south and west towards the shore. The site is covered by thick pasture grass that is kept cropped by grazing stock, and is located approximately 5m from the modern road alignment. Local informants confirmed that artefact finds are

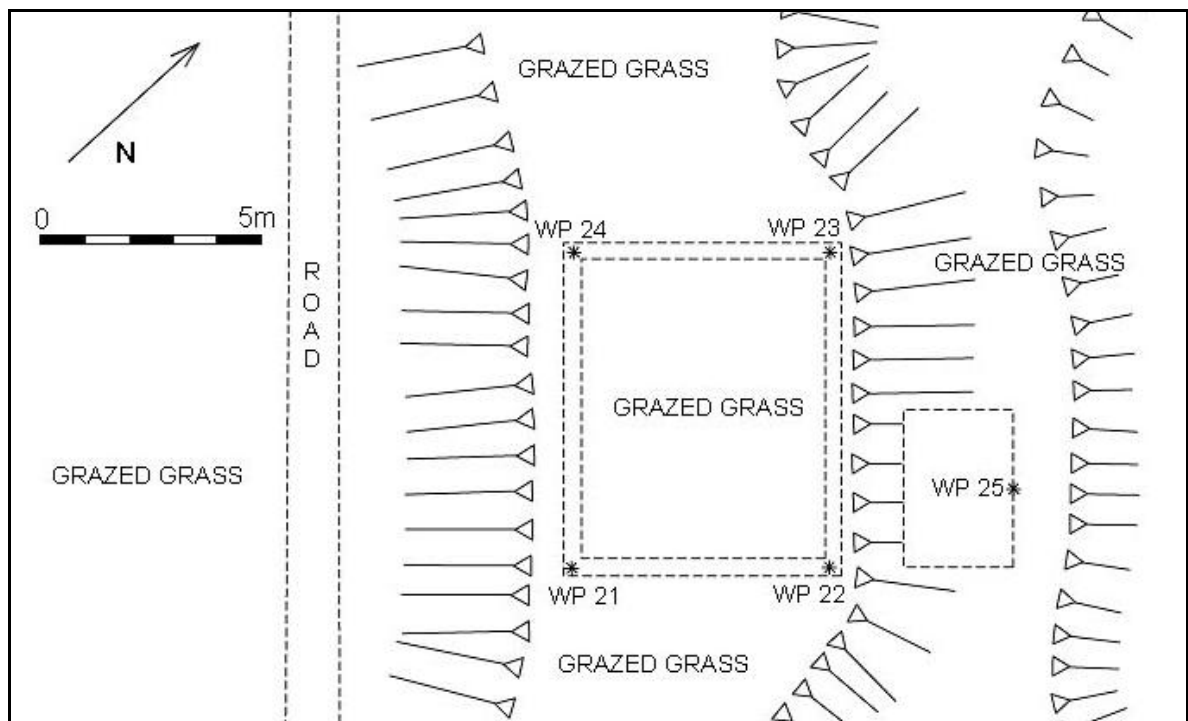


Figure 4.61: 2003 GPS survey of the Johnson's house site

known in the dunes along the shore adjoining the site, such as clay pipes, buttons and one instance of human remains, but the exact location of these finds or the eventual keeping places of these artefacts is not clear (Fenton 2003, 2004; Shick 2004). Actual finds on the Johnson site in recent years were not known, and any surface scatters have been hidden by thick turf for many years. Disturbance on the site was potentially varied, but did not appear to have been significant in recent years. Stock and feral animal trampling seemed to be constant and long term, but thick pasture moderates potential damage, and the volume of stock grazing has been consistently low. The proximity of the road was another issue, as it was at least likely to have disturbed other features in the area, and possibly separated the house site from associated features closer to the shore. Any impact from the road construction itself was unclear, but appeared to be minimal from surface observations.

Survey and Ground Penetrating Radar Results

Later pedestrian and dumpy survey of the Perry Johnson site covered a much larger area than the house site previously identified. As mentioned above, a network of hand cut ditches and garden remnants have long been associated with the Johnson occupation and are well in evidence today. The pedestrian survey covered an area that included the land to the immediate west of the road towards the shore, and the land to the immediate east of the

house site and extended both up and down slope from the house site to the northern and southern boundaries of the modern lease. Given the size of the area surveyed, it was divided into three sections for ease of survey and reference, sections one, two and three. Section one, the land occurring between the road and the shore is a virtually featureless grazed paddock completely bare of larger vegetation, and apart from the modern creation of a farm track and recent stock burial pits, showed no obvious surface evidence from the Johnson occupation with the exception of a hand cut well which is still in use in the south-east corner of the area adjacent to the road. The current leaseholder's father is known to have widened the well and lined it with stone, but the original well is thought to have been dug by the Johnsons. There is a high likelihood of other remains occurring in this area but the size and featureless nature of the land made it impossible to record or sample in any meaningful way, and thus no features from this section occur on the survey apart from the well (see Figure 4.62).

Section two encompassed all the area occurring on the slope bounded by the road to the west and the ephemeral creek to the east, and included the previously recorded Johnson house site and the Fenton's house sites. This area is characterised by a continuous slope which runs north-west to south-east following the alignment of the road to the west and sloping away eastwards into the creek basin below. The upper section of the slope has a series of features associated with the Fenton's occupation on the land during and after the later years of the Johnson's residence on the land. Three mature Norfolk pine trees delineated part of the old house fence line and shade the sites of two dwellings, one house to the front belonging to Ellen Fenton, and the second house at the back belonging to her son and his family, including his son Esven who is the current leaseholder (Fenton 2003, 2004). Most of Ellen's house site has been disturbed by the cutting of a drainage culvert for the road, and the only discernible trace remaining appears to be some depressions that are possibly refuse pits, as a glass bottle dating from 1934 to 1948 was found in the top of one (see Figure 4.63; Burke and Smith 2004). The site of Esven's house is more intact, with a discernibly flat area occurring to the back of Ellen's house site, in association with several obvious remains such as a cement tank stand (Figure 4.64), a cement stove footing (Figure 4.65), an old house pier in the form of a tobacco tin filled and coated in concrete (Figure 4.66) and a substantial earthing rod and wire housing which Esven recollects was part of the aerial for his father's radio (Figure 4.67; Fenton 2003, 2004).

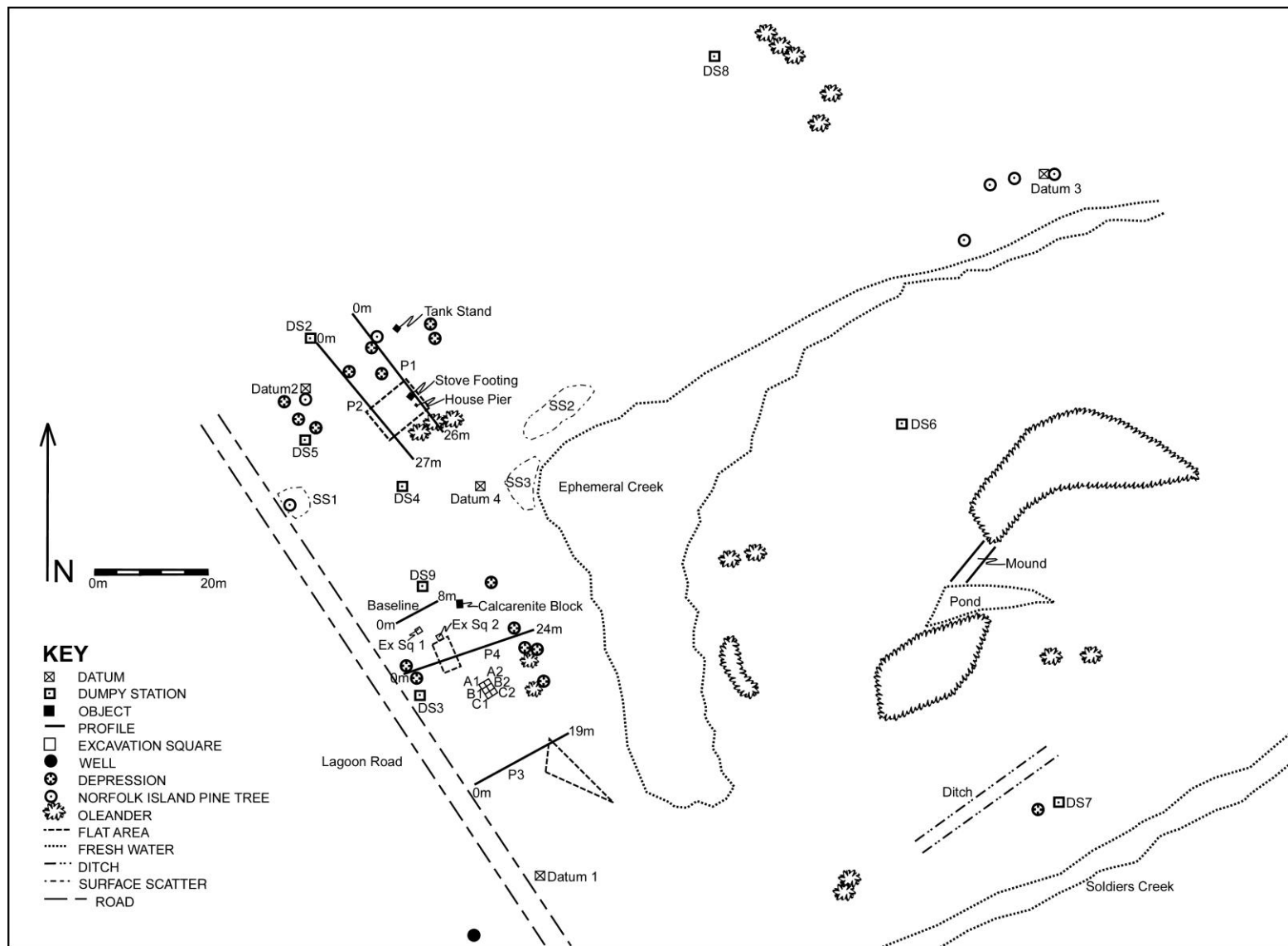


Figure 4.62: Survey of section two and three of Perry Johnson's Land



Figure 4.63: Whole clear glass bottle recovered from the surface of one of the depressions recorded near the site of Ellen Fenton's former dwelling



Figure 4.64: Cement tank stand with traces of cement lined iron tank that once sat on top of it



Figure 4.65: Cement footing for large wood stove



Figure 4.66: Iron tobacco tin filled and coated with cement to create a commonly used house pier on LHI (Fenton 2004)



Figure 4.67: Metal fixtures associated with radio



Figure 4.68: Surface scatter occurring along and directly above and below regular cattle track. The items found are most likely associated with the Fenton occupation

Several depressions occurring immediately outside this house site appear to be likely candidates as refuse pits and a couple occurring further away from the house are approximately where Esven recalls the long drops being placed at numerous times. Remnant oleanders occurring around the south-east corner of the house site are also part of the old house fencing, which also included a section of dry stone wall (Fenton 2004). A surface scatter (number two) of glass, ceramic and metal artefacts eroding out of the slope directly south-east and down slope from this house area was recorded (Figure 4.68), with material being trampled out of the soil by cattle. The debris recovered comprised of items that have a broad date range from the 1920s to the 1960s and appears to be entirely associated with the later Fenton occupation of the area. Another surface scatter (number one) was recorded in this area under the large Norfolk pine tree that stands next to the modern road. The scatter occurs immediately around the base of the tree, and comprises mostly modern beer, wine and soft drink bottle glass. There are a few shards ceramic but they appear to be roughly contemporary with the glass, and all appears to be part of modern roadside debris rather than material associated with either the Johnson or Fenton domestic occupations. Two profiles were measured down the slope and across the house site to gauge the extent of the level area, and measure the slope of the non level areas. The first profile (see Figure 4.69) shows the occurrence of one of the depressions at 6 to 8m and the more marked portion of ‘level’ ground from 14 to 18m, which is also illustrated at the same measurement in the second profile (see Figure 4.70).

The lower section of the slope includes the area previously identified as the likely location of the Johnson’s house and the presence of the depressions and flattened areas recorded previously were confirmed by a second inspection. An additional flattened area in the approximate shape of a triangle was located further down hill and these two were measured by profiles three and four to gauge the extent of these ‘level’ areas (Figures 4.71 and 4.72). Profile three illustrates very well the flat top of the slope, the sharp descent towards the creek, and the flattened out section marked on the survey. Profile four further shows the flat top as well as a second levelled area between 7.5 and 10.5m which coincides with the smaller flat area originally recorded in 2003 (see Figure 4.61). Additional features recorded included a series of five small depressions at the eastern edge of the slope before descending into the creek basin, two small stands of remnant oleander and a large hand-cut calcarenite block resting on the surface. A third surface scatter occurring further down slope from surface scatter two was recorded, and consisted of a

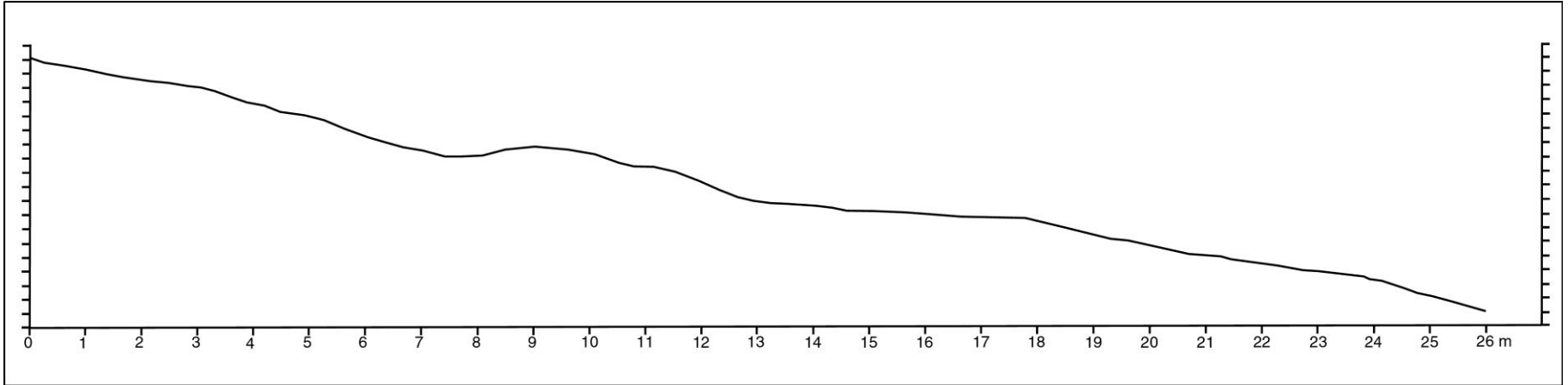


Figure 4.69: Perry Johnson's land profile 1

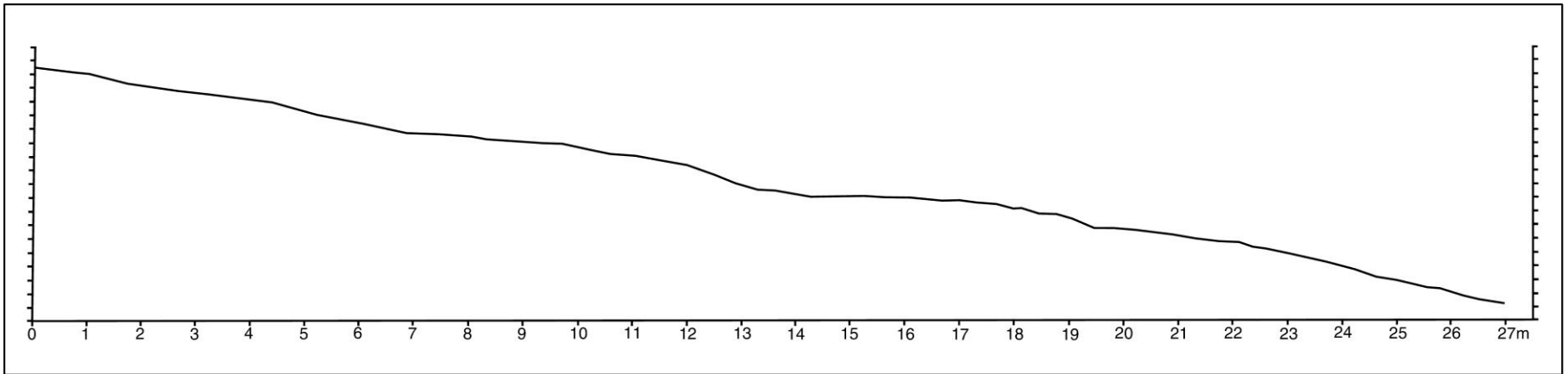


Figure 4.70: Perry Johnson's land profile 2

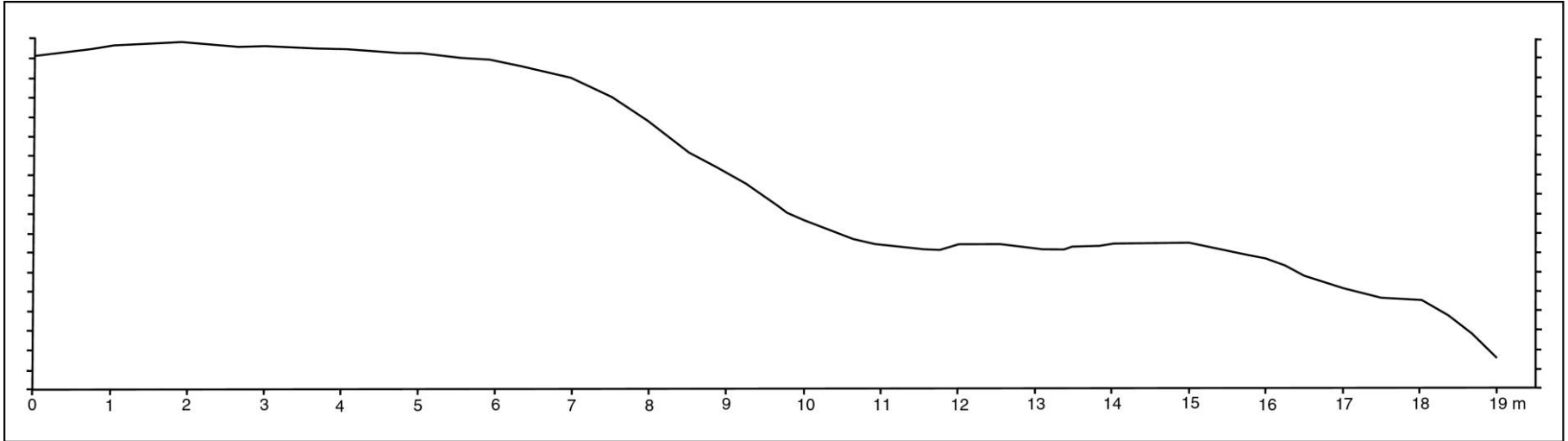


Figure 4.71: Perry Johnson's land profile 3

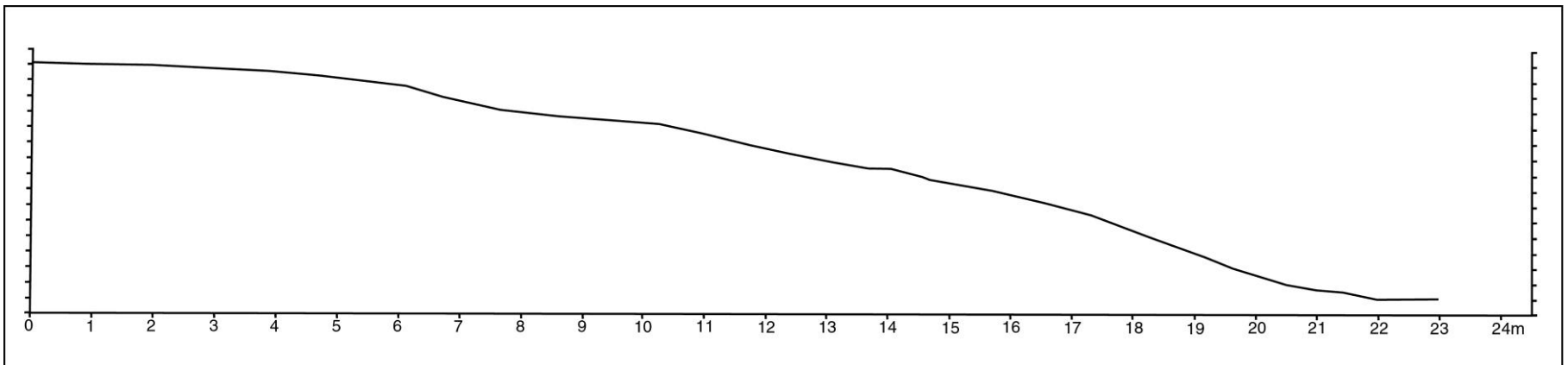


Figure 4.72: Perry Johnson's land profile 4

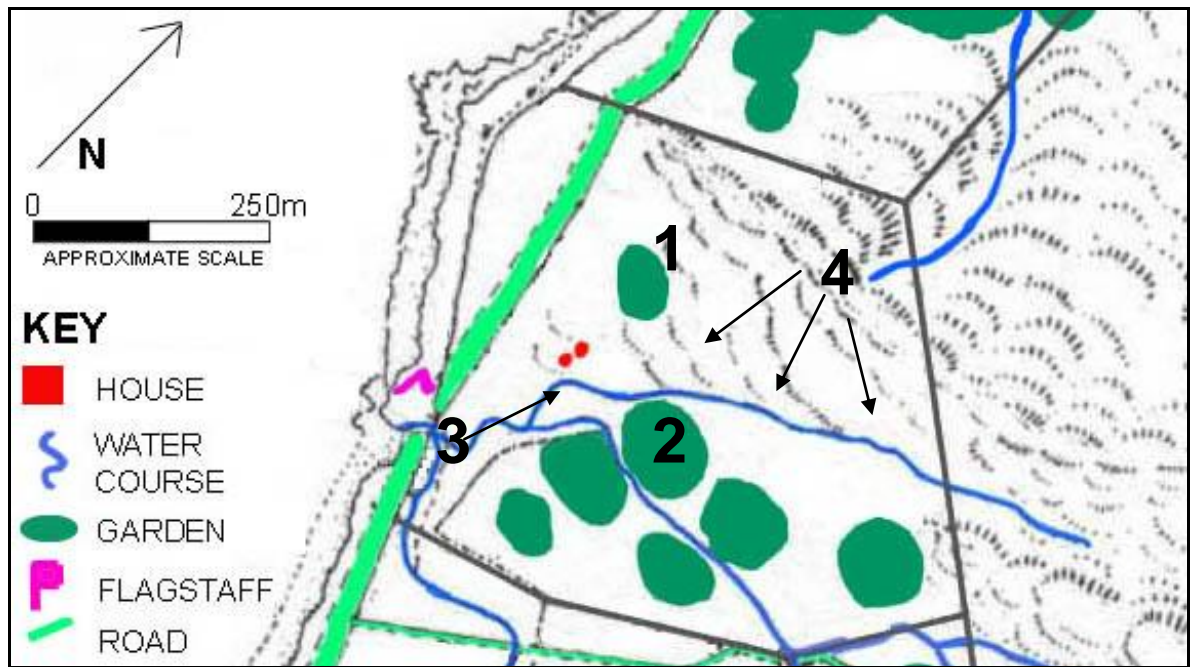


Figure 4.73: After Anon 1898. (1) The only garden recorded north of the creek corresponds with the oleander recorded. (2) The larger stands of oleander south of the creek are most likely from this garden. (3) Approximate position of the modern ephemeral creek. (4) Approximate location and area of recent land slips

similar variety of glass, ceramic and metal objects eroding out of the slope as a result of both stock and water action. The items collected from this area appeared to be of a mixed age, and are likely to be contemporary with both the Johnsons and the Fentons. Due to the eroded nature of the area it is difficult to assess what kind of feature this may have been prior to the change in the creeks course (for example a marked depression, mound or site of a building).

The third section encompassed the features evident on the low lying ground in the creek basin to the east of section two. Remains in this area comprised mostly of remnant vegetation, water sources and drainage features. On the northern side of the creek, a small stand of oleander was recorded whose position approximately corresponds with a garden recorded on the Johnson's land in the 1898 map (see 1 in Figure 4.73). A small cluster of four mature Norfolk pine trees were also recorded, but the significance of their position (if any) is not known. Several large and small stands of oleander were recorded south of the creek, and again these correspond approximately with gardens marked on the 1898 map (2 in Figure 4.73). A depression recorded adjacent to dumpy station seven was particularly conspicuous as its size, shape and depth suggested it might be the remains of a filled in well, but this cannot be confirmed as the 1898 map does not record any wells in the vicinity, let alone two. The small pond that lies between two stands of oleander, the

ephemeral creek and ditch recorded are remnants from the old route of Soldiers Creek, prior to its current course being made by the widening and deepening of one of the Johnson's old ditches (Shick 2004). The ephemeral creek, which occasionally meets the main stream of the modern Soldiers Creek, lies in the old bend of the creek that is recorded on the 1898 map (3 in Figure 4.73). Recent land slip events from the steep slope immediately north of the basin have also altered the hydrography of the area, with the eastern end of the creek and several ditches that drained into it being completely covered by the earth (4 in Figure 4.73). A series of silted up ditches lie a further 120m east in the midst of a modern palm plantation whose overgrown condition made the ditches impossible to record without significant clearing work being done.

Following the pedestrian and dumpy survey several areas in section two were selected for GPR survey, as the primary excavation priority for this site were features associated with the domestic occupation of the Johnson's. The flattened areas previously recorded as possible locations of Johnson house were primarily investigated, along with some of the depressions recorded east of them to see whether there was any subsurface indication of refuse or disturbance. The GPR survey did not reveal anything particularly significant across most areas surveyed, including the small depressions to the east of the Johnson house and those associated with the Fenton houses. Two exceptions were an area of interest identified a short distance up hill from the rectangular shaped area recorded, and another feature which ran concurrent with the elongated depressions on the road side of the large rectangular area recorded in 2003. Information later came to light which revealed that the second anomaly (as seen in Figure 4.74) was in fact a Telstra cable and trench that were excavated and laid about 12 years ago. The presence of this cable not only explained the anomaly on the radar images, it provided proof that the radar was indeed able to identify features in the matrix of the PJJ area and helped explain the elongated depression above it as likely infill deflation. It did however cause concern as to the likelihood of significant disturbance of the probable Johnson house site, and subsequently it was decided to excavate the area of the first anomaly to test not only the nature of the feature but also to test any potential disturbance of the area by the Telstra trench and the construction of the road.

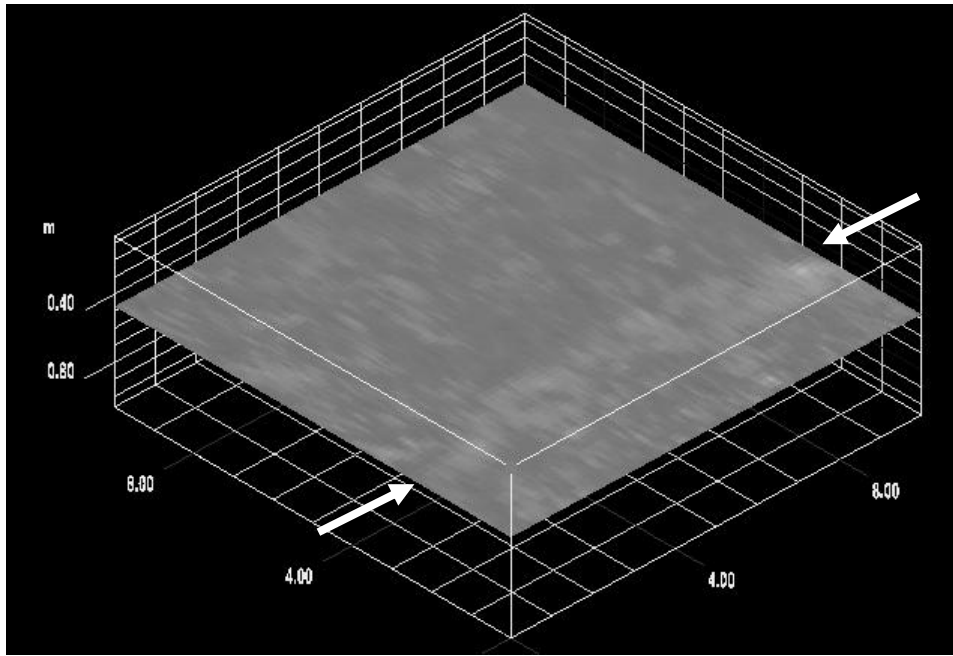


Figure 4.74: Three dimensional diagram of the GPR survey showing a lineal anomaly occurring at a depth of approximately 45cm indicated by the arrows

Excavation Results

Test excavations began with a one by one metre square situated to investigate the only feature of note shown by the GPR survey. Excavated in five centimetre arbitrary spits, the square had a total of seven spits, the last spit being sterile and ending in an impenetrable sand conglomerate that appears to be the base material of the old dune (see Figure 4.75). The matrix of the pit consisted predominantly of a grey coloured sandy soil which extended from the turf to a depth of 30cm, where it gave way to yellow sand and conglomerate. In the north-west quarter a foreign soil was encountered which had a higher clay and stone content and occurred from 2 to 12cm (see Figures 4.76 and 4.77). This unusual soil was quite compact and contained a lower ratio of artefacts compared to the sandy soil matrix of the same depth but contained a much higher proportion of bitumen pieces, which occurred across the square throughout the first 20cm. The marked difference of this soil most likely accounts for the feature that was apparent on the GPR, and due to its bitumen content is almost definitely fill from excavations associated with the construction or maintenance of the road and a drainage culvert which currently terminates 5m to the north-west of the square. Part of the fill may also be from the Telstra trench excavation which runs the length of the slope parallel to the road, as the clay content may be from the deeper excavation of at least 45cm, fully 10cm beyond the deepest point of archaeological



Figure 4.75: Square one end levels showing the sand conglomerate clearly across the whole square,



Figure 4.76: Square one west-north profile showing the clay rich fill at the top 10 to 12 cm of deposit

investigations. The inclusion of some artefacts in this fill is troubling, and suggests that cultural material has been disturbed in the construction of the road, culvert or Telstra trench or all three depending on the source of the fill. The square contained a variety of artefacts across all the fabric types; material occurring in spits five and six were more likely to be in their original deposition and from their size and variety, could have been associated with a house deposit, possibly as either a floor, underfloor or sweep zone feature.

Due the disturbance evident in the first square and its likely proximity to the house site, the second test square was positioned in to avoid likely disturbed areas while remaining close to square one, in an effort to locate the same deposit found in the lower spits of square one. A one by one metre square, square two was excavated in five centimetre arbitrary spits to a total of five spits, the last spit containing material in its upper 20cm before becoming sterile and hitting the same sand conglomerate encountered in the first square (see Figure 4.77). The matrix consisted of the same grey sandy soil encountered in the first square before becoming a yellow sand in spit five and in turn becoming conglomerate. The same varieties of fabric and object size were recovered from square two, with the exception of bitumen which was completely absent. This coupled with the absence of the clay soil confirmed the undisturbed nature of the square. Spit one was completely sterile, while spit two contained only a handful of items with the majority of material occurring from spits three to five. In addition, the reduced depth of the square by two spits or 10cm before hitting the same sterile sand and conglomerate confirms that the clay rich strata not only inflated the depth of the first square by about 10cm, it also contributed additional cultural material from another source. Although the material recovered from square two also appeared to be from a floor, underfloor or sweep zone

deposition, structural clues such as post holes, stone, timber, plaster or lime were not recovered, and the task of pinpointing which direction to investigate next was troublesome. It seemed obvious that at least a portion of the likely house site had been sampled at this stage, and as questions regarding the location of kitchen, dump, privy and farm building features were still outstanding, and time was limited it was decided to conduct shovel tests elsewhere on the slope in likely spots for these features.

The second shovel test produced a considerable amount of material which was notable compared to artefact densities observed in the two previous excavation squares, and as such it was decided to position a third excavation square directly adjacent to the shovel test to ascertain whether this were either a dump or privy site given the artefact density, or a high use area near or under a building such as a kitchen or farm shed. Square three, a one by one metre square was excavated in five centimetre spits through six spits of matrix identical to that encountered in the previous two squares, ending in the yellow sand and sand conglomerate. The material recovered from square three again covered the variety of fabric, but non organic objects on average were less fragmentary and the square produced nearly three times the amount of artefacts than the previous two squares combined. In addition, a medium sized, flat, calcarenite rock was uncovered from spit one to three, in the south corner of the square, and given the previous surface observations and excavations of the immediate area, was most definitely a manuport (see Figure 4.78). The significance of the rock was not clear, however the volume of material recovered, and the occurrence of obvious materials in the west-south and west-north profiles warranted further investigation, and a two by three metre grid was measured out to enable further investigation, with square three being relabelled B2 (see Figure 4.79).

Excavation of A2 was undertaken next, due to the amount of material evident in its common profile with B2, and within the first five centimetre spit, another flat calcarenite rock of obvious human origin was revealed. The presence of two rocks, of similar size, origin and occurring at similar depth was significant, and as the possibility of these being a structural footing of some type was realised, it was decided to simultaneously excavate A1 to ascertain the presence of further rocks and if so, facilitate any horizontal comparisons that might be made while revealing any further structural evidence or items of contemporary age. Again, within the first spit, the very top of a calcarenite block was found (see Figure 4.80), and seemed to indicate that there did indeed appear to be some sort of structural significance to the blocks. Continued excavation of both squares found the

surface depth at which they would have sat was contemporary with the first rock in B2 at approximately 12 to 14cm or within spit three. To conserve time and resources, excavation of spits four and five were limited to 50 x 50cm squares in the east corner of A1 and the south corner of A2 (see Figure 4.81). At the bottom of spit five in both squares the sand conglomerate preceded by the yellow sand was encountered, preventing the excavation of six spits in all squares, as it appears that the conglomerate varies slightly in its depth and this may be influenced by the upslope position of both A1 and A2 in relation to B2. The variety and size of materials recovered from these squares matched that recovered in B2, but the total volume and specifically the volume in spit three, which consistently produced the largest volume of cultural material across all three squares were significantly less than B2.

In an effort to locate any further calcarenite rocks, spit one of C1 was excavated in a one by one metre unit, but upon failing to reveal any evidence of more rocks as the previous squares had, it was decided to proceed in a 50 x 50cm square in the south corner to conserve time and resources and collect a controlled sample. Similar artefacts to the other squares were recovered from the same grey matrix, but the yellow sand and conglomerate were revealed at the 13 x 15cm mark in spit three. This unusual occurrence was further tested by three shovel pits dug in the remaining areas of C1, which confirmed the increasing depth of the conglomerate the further down hill towards B2 it occurred. Two of these three pits revealed artefacts which were also collected and included in analyses as their provenience was well known as shovel pits were dug in a controlled manner as similar to five centimetre intervals as possible. Failing to find additional rocks in the excavations, a series of probing exercises were undertaken in an effort to find more calcarenite rocks of similar proportion and spacing, as the rocks revealed in the excavations occurred a fairly uniform distance apart, 1.65m. Measuring at right angles from the rocks, likely areas were found and probed, and any that showed evidence of having large, hard objects just below the surface were shovel tested to confirm the presence or not of rocks similar in form to those excavated. Two additional calcarenite rocks were found of similar size and depth at appropriate positions (see Figure 4.80), while seven other shovel pits failed to produce likely rocks, although pits two and four produced small amounts of artefact material which were collected and analysed.



Figure 4.77: Square two end levels showing the sand conglomerate just appearing through the yellow sand layer

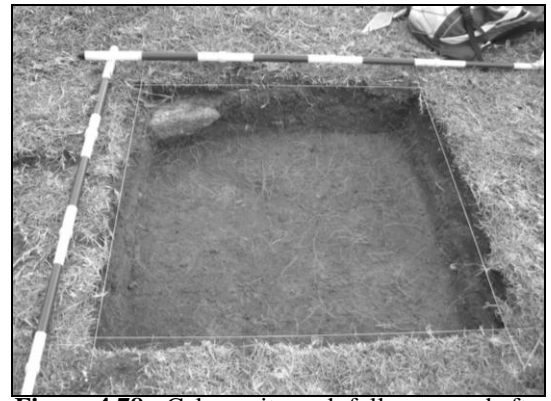


Figure 4.78: Calcarenite rock fully exposed after three spits in the south corner of square B2 (3)

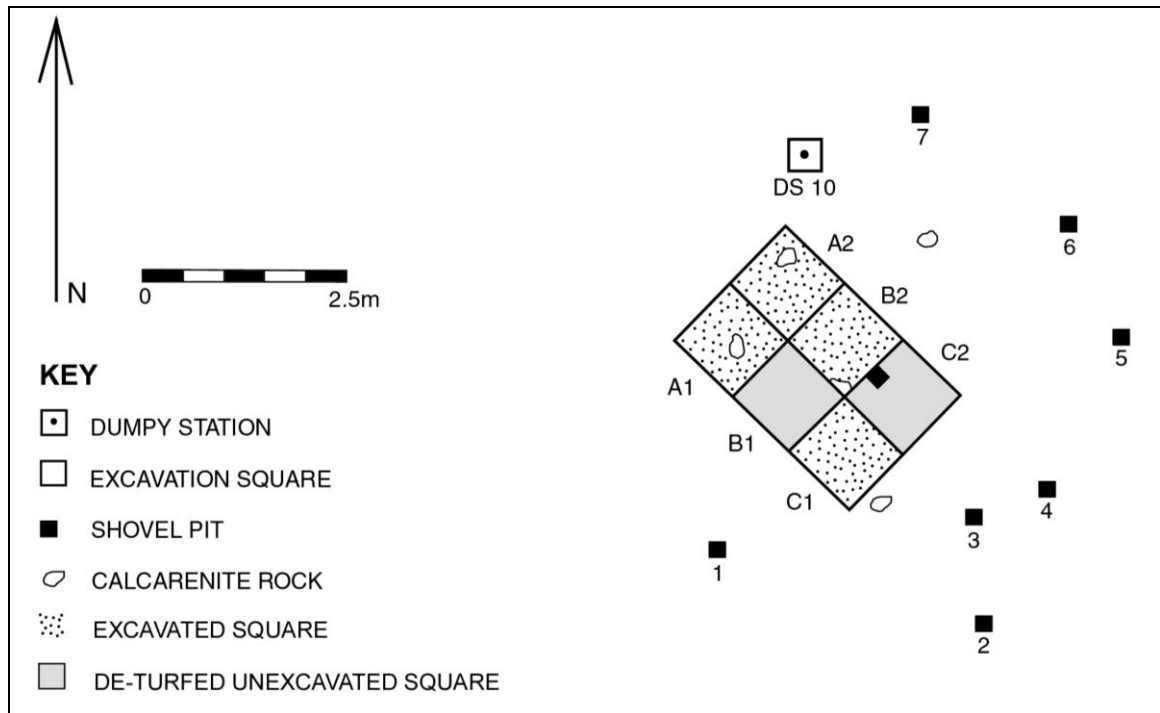


Figure 4.79: Excavation grid laid out around excavation square 3 (B2) and the artefact rich shovel pit in C2



Figure 4.80: Spit 1 excavated in A1 and A2 revealed clearly on calcarenite rock in A2 and the very top of another in A1 indicated by the arrow



Figure 4.81: Both A1 and A2 excavated to 15cm (spit 3 with spits four and five being excavated as 50x50 cm squares in the east and south corners respectively)

At the conclusion of excavations at PJJ, it appeared that one disturbed and one undisturbed sample of some form of house associated deposit, and a significant portion of deposit associated with either a kitchen or shed was collected. Further, evidence to suggest the presence of at least a section of timber plank flooring as indicated by the presence of small but sturdy calcarenite blocks suited to use as piers was revealed. A varied artefact assemblage which included domestic glass, ceramic and metal items as well as a large faunal collection indicating terrestrial and marine subsistence similar to OSBF was recovered and included species such as: pig (*Sus scrofa*), goat (*Capra circus*), pipi shell (*Plebidonax deltoides*), strawberry cockle (*Fragnum unedo*), black nerite (*Nerita atramentosa*), native land snail (*Placostylus bivaricosus*), mouse (*Mus musculus*) and cow (*Bos taurus*). In total 4554 individual items of cultural material weighing 2038 grams were excavated from approximately 1.36 cubic metres of sandy grey soil and yellow sand matrix, including objects recovered from spade pits. From surface scatters one, two and three and the bottle collected from the depression adjacent to Ellen Fenton's house site, 153 items weighing 1181grams were collected and are included in assemblage analyses.

Despite the lack of materials in two of the four sites tested, the excavations at LHI were resoundingly successful and the resultant assemblages and features uncovered are a nice representative sample of domestic occupation sites on LHI. The sites recorded were selected as a group of representative examples of occupation sites with overlapping occupation dates which spanned the entire settlement period of interest. Happily, the two sites that yielded material are still likely to be representative of the entire LHI settlement period of research interest, from the earliest period up to the turn of the century, with potentially only five to ten years being missed between the two different occupations.

Chapter Five

Everyday Chattels and Sunday Dinners: Artefact and Midden Analysis

Artefacts collected on LHI were restricted to the six surveyed sites, and the majority of the assemblage originates from the excavated features at OSBF and PJJ as described in the previous chapter. A small number of surface finds were collected at NBS, NBG, and OSBH: all of which were found apart from the main locations of research interest at each respective site and are, with perhaps one exception, of modern (20th century) origin. These finds were collected, classified and catalogued in the same manner as the remainder of the assemblage, but do not feature in any further discussions, as they are demonstrably artefacts from a period after the original occupations of research interest and lie outside the scope of this study (for an artefact summary of these finds see Appendix 1). The remaining artefact assemblage is of research interest and is comprised of excavated finds from OSBF and excavated and surface finds from PJJ. This collection consists of artefacts typically found in domestic and agricultural Australian historic sites and thus it was deemed appropriate to use a classification system for artefact identification and analysis similar to those widely used in other historic archaeology studies (see next section).

All artefact and midden identification, classification, cataloguing and analysis were undertaken by the author unless otherwise stated. These identifications were conducted in consultation with a wide range of printed reference materials on historic artefacts (eg Albert and Kent 1949; Boow 1991; Burke and Smith 2004; Busch 1991; Coysh and Henrywood 1982; Gallagher and Price 1987; Godden 1999; Miller and Sullivan 1991; Nonte 1973), general species identification (eg Coleman 1988 and 2002; Dakin 1987; Hutton 1990 and 2002; Romer 1955; Wilson 1994) and specific archaeological faunal analysis (eg Bowdler 1979; Cornwall 1966; Howell-Meurs 2000; Lyman 1987; Schmid 1972) as well as reference collections of faunal materials held at the Australian National University (ANU) School of Archaeology and Anthropology, and the ANU Research School of Pacific and Asian Studies (RSPAS) department of Archaeology and Natural History. These faunal collections included specimens of most domesticated animals common to Australia and the Pacific, some marine mammals and a wide selection of seabirds and fish common to tropical and temperate Pacific waters. Most instances of outside input involved the

undertaking of highly specialised tasks such as micro biological analysis by Janet Finn from the department of Archaeology and Natural History, RSPAS, ANU; lithic identification by Sophie Collins and unusual faunal identification by Professor Colin Groves, both from the School of Archaeology and Anthropology, ANU and are referenced as such where applicable. Others looked over portions of the assemblage and gave their general impressions and feelings on the nature assemblage, provided anecdotal information on types of objects and provided some object and anatomical identifications. Dr Wayne Johnson of the Sydney Harbour Foreshore Authority; Dr Martin Gibbs of Department of Archaeology, University of Sydney; Dr Eleanor Casella of the School of Arts, History and Cultures, University of Manchester; and Dr Mike McPhail from the Department of Archaeology and Natural History, RSPAS, ANU, all provided valuable input on the historic assemblage. Dr Keith Dobney from the Department of Archaeology, University of Durham, provided anatomical identifications on the *Sus* teeth and highly useful information relating to assemblage preservation, formation and fragmentation.

Classification System

All artefact material collected on LHI has been classified and catalogued using a basic fabric hierarchy, followed by a functional analysis developed for this project and where appropriate, faunal anatomical and species identification. This system of categorisation and functional analysis builds upon those used in the 1990s Rocks excavations in Sydney CBD, the ongoing Port Arthur excavations in Tasmania and the ongoing Kinchega homestead study in western NSW (Godden Mackay Pty Ltd 1999; Davies and Buckley 1987; Allison 1998; 2003). This classification of artefacts in turn allows more detailed studies to be undertaken, such as dating objects, identifying depositional patterns and testing for faunal selection. Dating the assemblage is particularly dependent on artefacts being accurately identified, as items such as nails, tobacco pipes, glass bottles, ceramic vessel types and decorative patterns can be particularly datable objects. Similarly, accurately ascribing anatomical and species identifications to faunal remains is vital to reconstructing an appropriate picture of animal recruitment, consumption and disposal.

Fabric Type

The fabric hierarchy consists of seven basic categories; glass, metal, ceramic, organic, composite, other and unknown which are in turn broken down into descriptive sub-sets appropriate to each category (see Figure 5.1). The unknown category does not have any artefacts from all of LHI, so for following discussions and illustrations, it will not be included. Gross counts of individual artefacts (whole objects or fragments) and gross weights (in grams) in each primary fabric category are used to provide a simple overview of the nature of the assemblage for each site and to enable some meaning to be ascribed to artefacts which are too fragmentary to allow any further identification.

Glass	clear	green	olive	black	brown	other	unidentified
Metal	iron	copper	copper alloy	zinc	lead	other	unidentified
Ceramic	earthenware	terracotta	porcelain	stoneware	pipe	other	unidentified
Organic	bone	shell	teeth	wood	seeds	other	unidentified
Composite	metal/wood	metal/bone	metal/glass	ceramic/wood	ceramic/glass	other	unidentified
Other	charcoal	ash	stone	fibre	other	unidentified	

Figure 5.1: Primary and secondary fabric categories

Function

Artefact ‘function’ is actually a term used here to describe three separate aspects of each artefact. First, ‘artefact type’ which is a simple identifying descriptor as found in everyday language use for the item; for example bottle, plate, fishhook, or button. In cases where the artefact could be one of two or three related objects it is labelled as such to denote these possibilities dependant on other features of the item; for example a clear, smooth, concave piece of otherwise undistinguishable glass would be labelled bottle/jar/glass as it is equally likely to come from a bottle, food jar or drinking vessel, where as a similar piece which was coloured brown would be labelled bottle/jar as it is possibly from a bottle or jar, but unlikely to come from a glass drinking vessel due to its colour. Instances where an artefact cannot be reasonably identified are labelled as such (unidentified), and no further classification of the item is undertaken. Artefact type is necessarily a large and varied category due to the range of objects that occur, and items are further defined by the use of a second category called ‘activity’. This refers to the general use to which an item is put, and is aimed at allowing a general grouping of items in loose

categories of activity relevant to the everyday operations of human life. For example, a group of artefacts such as a bowl, plate, food jar, cooking pan and spoon are all related to the activity of eating, and would all be put into that activity category. Similarly, a beer bottle, cup and drinking glass would be ascribed to the category of drinking, while items such as a jug which could hold food or drink or an object identified as a bottle/jar/glass would be put into the overlapping category eating/drinking.

The third level of definition aims to pinpoint, where possible, exactly what items are used for and is labelled ‘use’ category. This level of definition is not always relevant, and serves merely to clarify the nature of some objects, and allow a different approach to various items. In the eating group of objects listed above, some can be separated out again eg a bowl and plate are generally used for food service, while a pan is used for food preparation and a jar for food storage. Another example is a ‘bead’ which is generally used in the activity of ‘adornment’ of various items such as jewellery, clothing, footwear or personal accessories (handbags, hats etc) or household items such as lamps, tableware and napery, and depending on what type it is a use category of ‘apparel’ (jewellery and clothing), or ‘furnishings’ might be ascribed, or if the origin of the bead can not be distinguished the use category is simply ‘unidentified’. The combinations of artefact, activity and use are numerous and the general ‘function’ definition is intended to be broad, flexible and allow for overlap and the unpredictable vagaries of human behaviour in an effort of avoid rigid hierarchies and categories which have often been a source of criticism and difficulty of use in previous ‘functional’ analyses of artefacts.

The organic component the assemblage has to be approached slightly differently; non faunal material is subject to the same artefact/activity/function system as the other fabric types, eg a bone button with an activity of fastener for use on apparel. Conversely, faunal material has been categorised on the basis of class groupings such as mammal (warm blooded lactating animals), avian (bird), piscean (fish), mollusc (shell), echinoidea (sea urchins) and so on, followed by anatomical and species or family groups, for example mammal/femur/*Sus scrofa*. Where species/family identification is not possible, the class unidentified then applies (eg avian/humerus/unidentified); where the anatomical details are not known categories such as long bone, flat bone, bone or tooth apply, depending on the state of preservation, which generally excludes species/family identification (eg mammal/longbone/unidentified). In the case of shells, anatomical definitions can really only apply to two subclasses of shell, bivalves and gastropods, so an example for a shell

classification would be mollusc/bivalve/*Plebidonax deltoides*, or mollusc/gastropod/unidentified or mollusc/unidentified/unidentified. The exception to this is the case of operculums, which occur only in gastropods, and as such are classified as mollusc/operculum/*Nerita atramentosa* or other applicable species.

Artefacts in the other category vary in their level of definition; objects such as ash and charcoal are residues of human activity and are as such artefacts, yet they are hard to define in their current state as they have no intrinsic value and are the result of several distinct activities such as food preparation, food preservation, land clearance, rubbish disposal, heating etc. As such, charcoal and ash are defined merely as that, and are of interpretative value in reference to their provenience and quantity rather than as singular artefacts. Other objects that fall in the other category such as bitumen clearly do have fairly defined uses, and are subject to the same system of categorisation described above. The unidentified fabric category is by definition non-diagnostic, but all items that fall in this category are included in the artefact catalogue and assemblage totals.

Other Analyses

The majority of data derived from the OSBF and PJJ assemblages comes directly from the excavated and surface scatter artefacts which are classified by the system described above. A small subset of specialised data is derived from other sources, and adds some deeper insight into several issues of interest to the history of the sites, the island in general and the continued survival of archaeological remains on LHI.

Soil pH

Soil pH tests on different soil types identified in the excavations were conducted on samples from both sites to determine the general pH of the buried contexts. This was done to determine the influence these prevailing conditions were likely to have on the different types of fabric recovered and the impact this might have on the survival of archaeological material remaining in situ.

Micro-biological remains

Samples taken from the clay floor surface revealed at OSBF were collected and tests conducted by Janet Finn from the department of Archaeology and Natural History,

Australian National University to identify micro-botanical remains that might indicate the source of the clay used in the construction of the hut floor.

Old Settlement Beach Foreshore

Fabric Quantity

Following the basic sorting of 3741 individual artefacts weighing 7475 grams into the seven fabric categories (see Figure 5.2) it became very clear that organic material comprised over two thirds of the assemblage, accounting for 2628 pieces (or 62%) and 4947 grams (70%). Glass is the second most prolific category by weight and count, with the exception of the other category, whose inclusion of charcoal makes it slightly more numerous than glass while being the lightest. Metal is the next biggest category by weight and count, followed by ceramic and lastly composite, which wasn't represented at all in the OSBF assemblage, and will not be included in following discussions.

Artefact Distribution

The presence of the discard zones observed during excavation is confirmed when looking at the weight and count totals across all fabric categories except other (see Figure 5.3). The squares identified as the primary discard zones; H3, I5, J5 and K5 combined contain 84% of the assemblage by weight, and 75% of the assemblage by count (see Figures 5.4 and 5.5). Square H3 accounts for the majority of weight, and J5 the most items, with the successive squares having corresponding weight and count ratios with K5 having the next most to I5 having the least. The material from the discard zones are also more fragmentary than those from other squares, with the average weight per item in the discard areas being 0.444 grams, while the average weight outside the discard squares is 0.807 grams. The other category is more evenly represented across the site with regards to count, as it includes lightweight charcoal which occurred frequently in most squares.

	GLASS		METAL		CERAMIC		ORGANIC		COMPOSITE		OTHER		TOTAL	
	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt
TOTAL	1631	441	532	91	232	34	4947	2628	0	0	134	548	7475	3741

Figure 5.2: Total fabric weights and counts at OSBF

The weight of the other category was represented the most in D8 then E8, as the category not only included charcoal, but also cobbles of solidified ash. Charcoal occurred in significant numbers in D8 and E8, while the solidified ash was found exclusively in these squares. This in addition to the presence of burnt bone and glass in these squares confirms the suspected nature of the feature as being a fireplace or hearth used for the preparation of food.

From the occurrence of artefacts and general archaeological features identified during excavation, there are four identifiable areas or zones of activity at OSBF; discard, hearth, living floor and other. Discard and hearth areas have been discussed above; living floor refers to areas where the clay foundation is present in the whole square, while other refers to areas that include the edge of the foundation as well as areas that lay outside the foundation which do not include evidence of discreet discard deposit. All OSBF excavation squares have been assigned to one of these four categories (see Figure 5.6), and the distribution of the fabric categories across these areas confirms the presence of the

SQ	GLASS		METAL		CERAMIC		ORGANIC		COMPOSITE		OTHER		TOTAL	
	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt
A5	1	1	58	9	0	0	46	207	0	0	2	17	107	234
B5	1	1	1	1	0	0	3	5	0	0	4	40	9	47
C6	0	0	14	3	0	0	16	4	0	0	0	0	30	7
D6	0	0	0	0	0	0	2	2	0	0	2	11	4	13
D8	6	4	31	11	6	1	128	72	0	0	68	34	239	122
E3	0	0	0	0	1	1	20	5	0	0	2	3	22	9
E4	0	0	244	7	10	1	1	2	0	0	2	5	257	15
E8	0	0	62	30	2	1	102	54	0	0	20	28	186	113
F3	0	0	0	0	0	0	89	15	0	0	2	30	91	45
F5	0	0	6	1	0	0	11	20	0	0	2	17	19	37
F6	0	0	0	0	0	0	7	9	0	0	2	9	9	18
F8	3	3	94	3	8	2	14	5	0	0	2	17	121	30
F9	0	0	0	0	0	0	1	35	0	0	0	0	1	35
G5	0	0	1	1	0	0	1	3	0	0	2	41	4	45
H3	12	1	6	5	0	0	3705	821	0	0	0	0	3723	827
H4	0	0	0	0	0	0	12	20	0	0	2	34	14	54
H5	0	0	0	0	0	0	14	24	0	0	3	55	17	79
I5	12	4	10	6	0	0	315	151	0	0	5	82	342	243
J5	958	211	4	11	0	0	372	694	0	0	11	100	1345	1016
K5	622	205	1	3	205	28	76	461	0	0	2	22	906	719
N SP A	0	0	0	0	0	0	2	9	0	0	0	0	2	9
S SP B	16	11	0	0	0	0	10	10	0	0	1	3	27	24
TOTAL	1631	441	532	91	232	34	4947	2628	0	0	134	548	7475	3741

Figure 5.3: Total fabric weights and counts for each excavation square and shovel pit at OSBF

discard areas (see Figure 5.7). While some of the specific fabric distributions also reflect this general trend, particularly the glass, ceramic and organic categories (see Figures 5.8, 5.10, 5.11), the metal and other categories (see Figures 5.9 and 5.12) show slightly different distributions. The metal category occurs most frequently in the hearth feature in the form of unidentified flakes of rusted iron, which are likely residues from corroding cooking equipment such as pots, hooks and spits. The metal is then fairly evenly distributed around the rest of the zones and mainly consists of iron and copper alloy nails and may have originated from the structure itself, rotting or burning out of the walls or roof during the collapse of the building. The other category is also more evenly distributed across the zones, and though the hearth has the least other in it, this feature actually has the second highest concentration of ‘other’ (ash and charcoal) after discard (see Figure 5.13). The higher concentration in the discard zone may be due to the disposal of built up cooking ash and charcoal and possibly from the burning of refuse in an effort to reduce volume, smell and/or vermin.

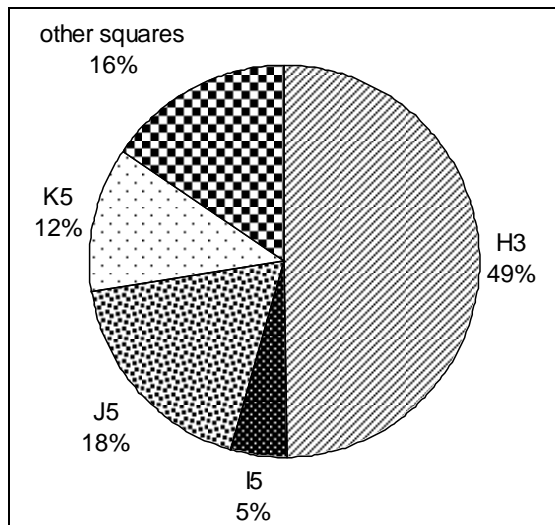


Figure 5.4: Summary of assemblage distribution between discard zones and other squares by weight

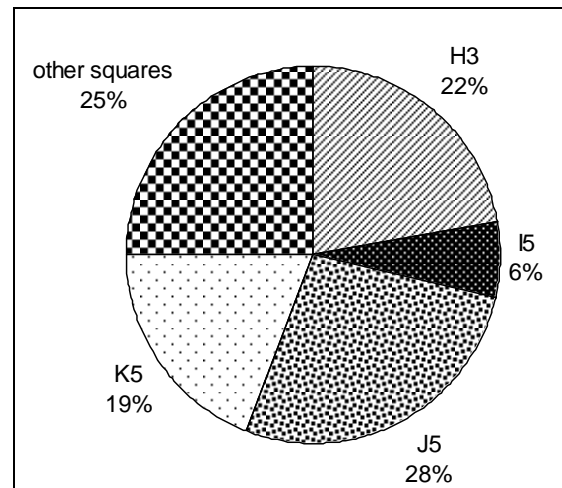


Figure 5.5: Summary of assemblage distribution between discard zones and other squares by count

Discard		Hearth	Living Floor				Other		
H3	K5	E8	B5	E4	F5	G4	A5	F8	H5
I5		D8	C6	E6	F6	G5	E3	F9	SPA
J5			D6	F4	F7		F3	H4	SPB

Figure 5.6: Classification of excavation squares into activity zones

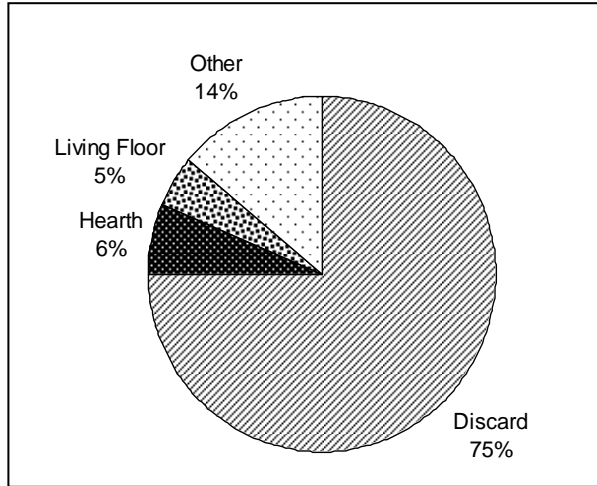


Figure 5.7: Distribution of total assemblage across activity zones

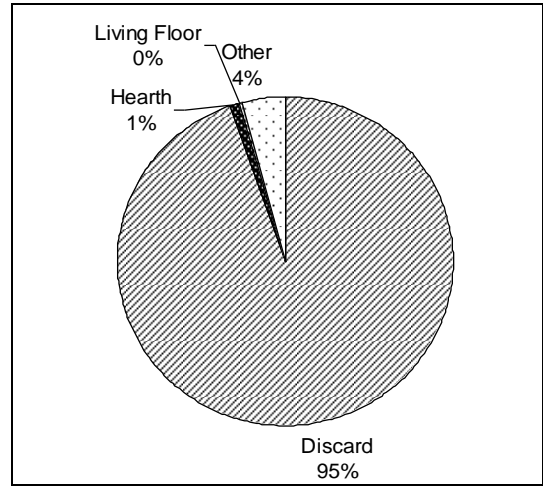


Figure 5.8: Distribution of glass assemblage across activity zones

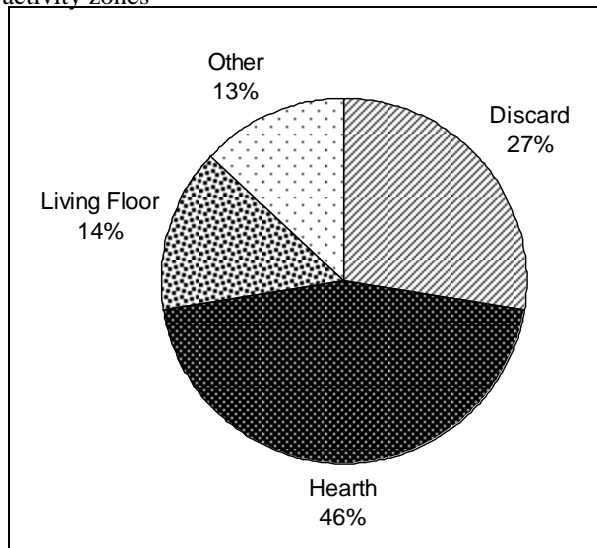


Figure 5.9: Distribution of metal assemblage across activity zones

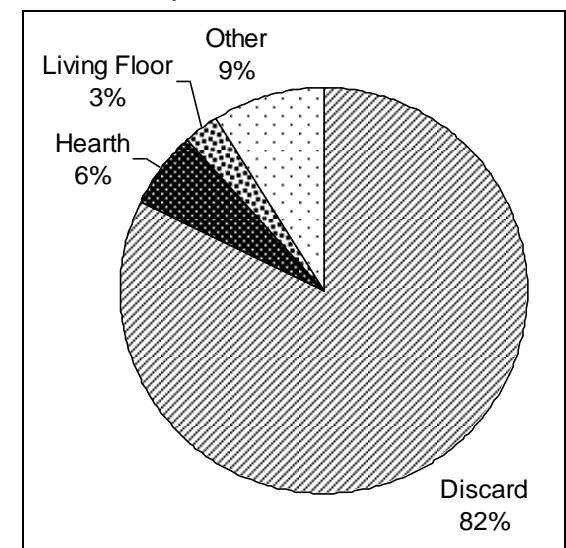


Figure 5.10: Distribution of ceramic assemblage across activity zones

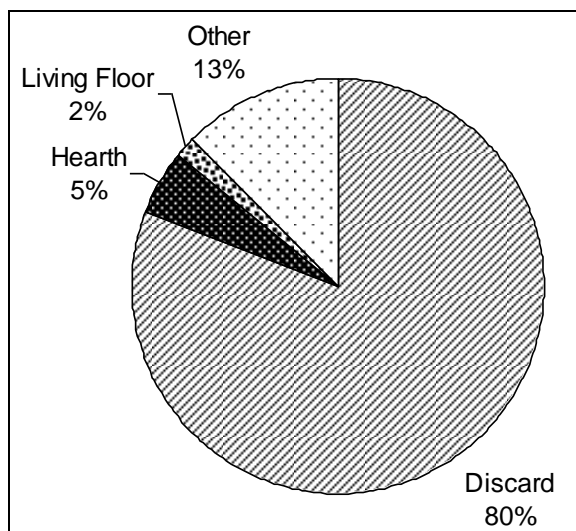


Figure 5.11: Distribution of organic assemblage across activity zones

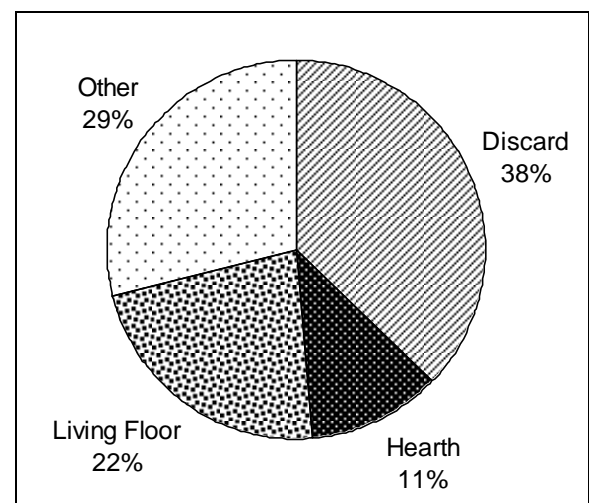


Figure 5.12: Distribution of other assemblage across activity zones

	Total Other	Number of Squares	Averaged Concentration Per Square
Discard	204	4	51
Hearth	62	2	31
Living Floor	123	11	11.182
Other	159	9	17.667

Figure 5.13: Concentrations of other (ash and charcoal) across different activity zones

Functional Quantities

Glass artefacts from OSBF occur in six artefact types (see Figure 5.14), with the majority of glass being insufficiently diagnostic to classify it beyond generic categories such as bottle/jar or bottle/jar/glass, the majority of which are in turn associated with eating/drinking or medicinal functions. Approximately 177 glass items are so fragmentary as to be completely non-diagnostic and come under the unidentified artefact type. Three glass bottle fragments are of particular interest, as they show evidence of secondary use. One large portion of a black bottle base shows significant wear on its bottom surface, indicating an extended use of the bottle beyond the life of its original contents, and was likely used as a decanter for food, drink or perhaps oil. The second item (see Figure 5.15) is also from a black bottle base, and has been partially knapped to form a sharp cutting edge on one side (Collins 2005). The third item (see Figure 5.16) appears to be a portion of a high quality clear glass ground edge stopper which has been struck from the stopper then uniaxially flaked to form a small cutting tool (Collins 2005). Two waste flakes from this item have also been recovered from the same area of the site, but from different excavation units, and their presence separate from the main artefact further indicates that the item is a purposely knapped tool rather than an accidental breakage in a glass rich deposit.

Artefact		Activity		Use	
Bottle	16	Drinking	14	Drink Service/Storage	13
Bottle with Stopper	1	Drinking/Medicinal	3	Drink/Medicine Service/Storage	2
Bottle/Jar	190	Eating/Drinking	21	Food/Drink Service/Storage	21
Bottle/Jar/Glass	55	Eating/Drinking/Medicinal	225	Food/Drink Storage	1
Stopper	2	Unidentified	178	Food/Drink/Medicine Service	124
Unidentified	177			Food/Drink/Medicine Service/Storage	101
				Food/Drink/Medicine Storage	1
				Unidentified	178
Total	441		441		441

Figure 5.14: Artefact type, activity and use categories represented in the glass assemblage from OSBF



Figure 5.15: Section of black bottle base that shows some evidence of being knapped, found H3

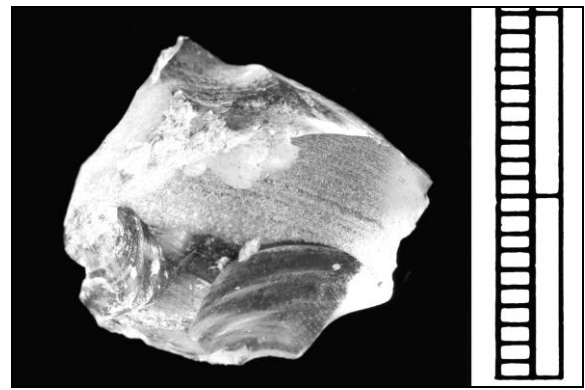


Figure 5.16: Section of clear glass ground edge stopper that has been unifacially flaked, found J5

Artefact		Activity		Use	
Cartridge	1	Defence/Hunting	1	Ammunition	1
Nail	20	Eating	1	Food Preparation	1
Nail/Wire	2	Structural	20	Unidentified	89
Pan	1	Unidentified	69		
Sheeting	1				
Unidentified	66				
Total	91		91		91

Figure 5.17: Artefact type, activity and use categories represented in the metal assemblage from OSBF

Artefact		Activity		Use	
Bowl/Canister/Cup/Jug	4	Eating	21	Food Service	1
Canister	1	Eating/Drinking	4	Food Storage	20
Canister/Urn	13	Leisure	2	Food/Drink Service/Storage	4
Canister/Urn Lid	6	Unidentified	4	Smoking	2
Pipe	2			Unidentified	4
Plate	1				
Unidentified	4				
Total	31		31		31

Figure 5.18: Artefact type, activity and use categories represented in the ceramic assemblage from OSBF

Metal artefacts also fall into six artefact types (see Figure 5.17), the largest proportion of diagnostic items being nails which have been classified in the structural group, as nails are integral parts of ‘structures’ such as houses, furniture, fittings and shoes. Non-diagnostic fragments accounted for 66 metal items, and datable items are exclusively nails. Of particular interest are two sections of copper alloy sheeting whose thickness and nail holes suggest it may be copper sheeting from a ship’s hull.

Ceramic items occurring across seven artefact types are more evenly spread around several vessel types (see Figure 5.18), with the largest category being canister/urn as it is likely that a large portion of the ceramic assemblage originates from one or two identical vessels. Thus the majority of ceramics are associated with eating and drinking, as the canister/urn vessel/s is a likely food storage container, and along with a single piece from a blue and white transfer plate used for food service, make up 80% of the ceramic assemblage. The plate and canister/urn fragments are also of particular diagnostic interest: the plate piece is of good quality earthenware and has a portion of a datable makers mark (see Figures 5.19 and 5.20) showing it to have been manufactured by Davenport, a Staffordshire exporter of middle range to fine quality ceramics to the colonies during most of the 19th century (see following sections: Borough of Blackburn Museum and Art Gallery 1978). The canister/urn fragments are of interest as they appear to be from an uncommon type of vessel of an unusual blue colour and are good quality, high fired earthenware (see Figures 5.21 and 5.22). The origin and date of this vessel/s is unknown but its quality and unusual form and colour are notable. The two earthenware pipe fragments recovered have been classified as being associated with leisure activities and more specifically used for smoking but are not particularly diagnostic as they are stem fragments with no stamps or distinguishing stylistic features. All ceramic items were able to be identified in some way, and therefore none fall into the unidentified category.

Charcoal made up the majority of the other category, accounting for 499 of the 543 artefacts, the remainder comprising 32 pieces of solidified ash and 17 slivers of some unidentified teal green substance, possibly paint flakes. The charcoal and ash’s main interpretive value relates to their distribution, as discussed above.

The vast majority of organic materials recovered are from faunal remains with the exception of two seeds, one piece of coral and one handmade bone button. The seed and coral species could not be identified, while the bone button is classified as a fastener for apparel, and is the only item of human manufacture from organic materials collected at

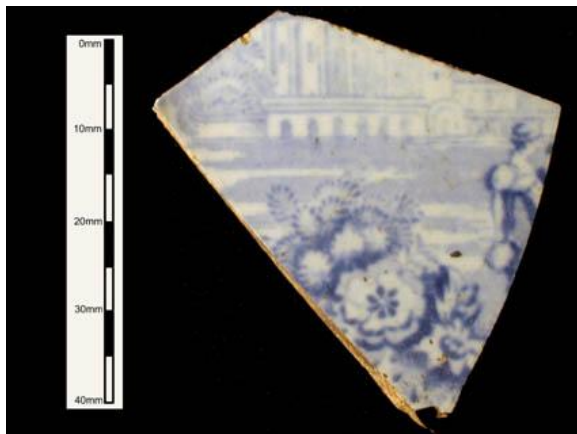


Figure 5.19: Pattern side of Davenport blue and white transfer print earthenware plate



Figure 5.20: Partial makers mark on reverse of plate showing printed and stamped word 'Davenport', stamped anchor and first letter of pattern

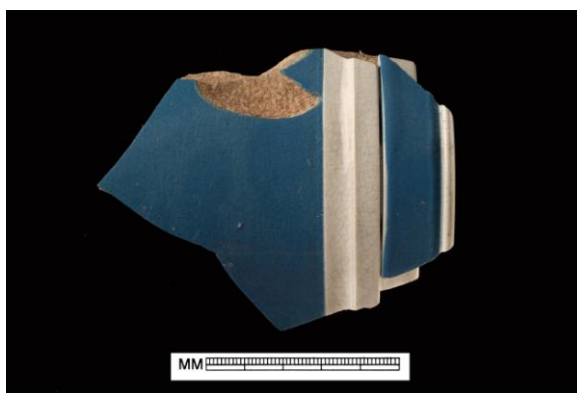


Figure 5.21: Rim and lid portions of blue and white high-fired earthen ware vessel



Figure 5.22: Side view shows flush fit of lid and vertical side of vessel

OSBF. The remainder of the organic assemblage falls into seven classes, the most numerous being mollusc, followed by avian, mammal, unidentified, echinoidea, piscean and alcyonaria. These in turn fall into 49 anatomical and 18 species or family groups (including unidentified in both) (see Figure 5.23).

Minimum Number of Individuals

The predominance of mollusc and avian remains is marked, as shown by the gross counts or on a species level, the Number of Identified Specimens (NISP), and is supported

Class		Anatomical Element	Species or Family	
Alcyonaria (Soft Corals)	1	Astragalus	1 Cypraea (Cowries)	1
Avian (Birds)	808	Bivalve	864 Nasariidae (Dog Whelks)	1
Echinoidea (Sea Urchins)	58	Bone	579 Naticidae (Sand Snails)	1
Mammal	376	Canine	2 Nerita atramentosa (Black Nerite)	43
Mollusc (Shells)	1046	Coracoid	11 Cellana howensis (LHI Limpet)	2
Piscean (Fish)	46	Coral	1 Polenices (Sand Snails)	1

Unidentified	292	Clavicle	5	Potamididae (Mud Whelks)	15
		Ear Bone	1	Trochidae (Top Shells)	8
Artefact		Epiphisis	6	Fragnum unedo (Strawberry Cockle)	16
Button	1	Femur	14	Plebidonax deltoides (Pipi)	846
		Femur and epiphisis	1	Gudeoconcha sophiae (Round Land Snail)	16
		Fibula	3	Placostylus bivaricosus (Conical Land Snail)	36
		Gastropod	122	Puffinidae (Shearwaters)	134
		Humerus	16	Gallus gallus (Chicken)	1
		Incisor	1	Capra hircus (Goat)	3
		Juvenile Incisor	1	Sus scrofa (Pig)	40
		Juvenile Maxilla Canine	1	Mirounga leonina (Southern Elephant Seal)	1
		Juvenile Molar	1	Unidentified	1462
		Longbone	350		
		Lumbosacrale	9	Use	
		Mandible	3	Apparel	1
		Mandible and teeth	1		
		Mandibular Canine	1		
		Mandibular Pre-Molar	1		
		Maxilla	6		
		Maxilla and teeth	2		
		Maxilla Molar	1		
		Metacarpus	9		
		Metatarsus	19		
		Molar	2		
		Operculum	25		
		Patella	1		
		Pelvis	6		
		Phalanges	41		
		Pre Molar	6		
		Radius	11		
		Rib	35		
		Scapula	5		
		Seed	2		
		Sesamoid	2		
		Shell	35		
		Skull	11		
		Sternum	6		
		Tibia	9		
		Tooth	2		
		Ulna	17		
		Unidentified	282		
		Urchin shell	58		
		Vertebrae	39		
		Activity			
		Fastener	1		
Total	2628	Total	2628	Total	2628

Figure 5.23: Class, anatomical element and species/family identifications for the organic OSBF assemblage

by minimum number of individuals (MNI) analysis; however the value of MNI for this collection is limited. Much of the organic assemblage is highly fragmentary, and MNI is practically impossible for most examples. Many long bones had at least one missing or broken epiphysial end, and mammal bone in particular is so fragmentary (see Figure 5.24) there are only four intact bones out of 357 identified as being mammal. Given these difficulties, MNI numbers given are calculated by simply dividing the NISP of a particular type (eg 14 *Puffinidae* metatarsus) by the number of that bone present in a single individual of that particular species or family (eg shearwaters have two metatarsis, therefore the MNI of *Puffinidae* based on metatarsus is seven). In the case of molluscs, the difficulty in identifying individuals is not so great, as the majority of gastropods in the assemblage are whole, and each individual is clearly identifiable. The two main species of bivalve are harder to distinguish individuals for, as each has two portions, and on many of the specimens the identifying features on the hinged part the shell is missing or damaged. As for bone, the MNI for bivalves is only a gross estimate based on species count divided by two. MNI for echinoidea is completely impossible as each individual has few features from which to distinguish individuals short of having near whole specimens, and all urchin remains from OSBF are very small fragments which exclude both MNI and species identification. Similarly piscean bone is small, fragmentary and unidentifiable, and is notable for its poor representation in a shore site.

Regardless of the limitations of MNI in relation to this assemblage (see Figure 5.25), it does re-confirm the dominance of molluscs in the assemblage and *Plebidonax deltoides* in particular, as well as the importance of *Puffinidae* (which is likely to be a mixed representation of two native species, *Puffinus pacificus*, the Wedge-tailed Shearwater and *Puffinus carneipes*, the Flesh-footed Shearwater or Muttonbird) in relation to other potential terrestrial food sources. The significantly reduced numbers of *Sus scrofa* in particular may be misleading, as a number of teeth and a femur with an unfused epiphysis from juvenile individuals ranging from infant to sub-adult have been recovered, which along with adult teeth suggest a higher number of individuals present than

Bone			Shell			Urchin Shell		
Weight	Count	Average Fragment Weight (grams)	Weight	Count	Average Fragment Weight (grams)	Weight	Count	Average Fragment Weight (grams)
798	1538	0.51886	4187	1011	4.141	11	58	0.18966

Figure 5.24: Averaged weights for different organic artefacts from OSBF showing varying degrees of fragmentation.

otherwise indicated by MNI. In this instance, differential preservation of juvenile and adult bone is highly probable as juvenile bones are less durable due to their smaller size and incomplete ossification, and this skewed representation of different age groups due to preservation conditions is a well known phenomenon in many archaeological contexts (Renfrew and Bahn 1996; Schmid 1972). The distinct lack of goat in both the NISP and MNI is of interest, as is the lack of chicken (*Gallus gallus*) and general scarcity of fish, as historical sources indicate goat and domestic poultry were readily available from feral stocks and fowl introduced at first settlement, while fish were a plentiful resource throughout LHI settlement (Anon 1849; Nicholls 1952; White 1835). As with the pig, there is potential for differential preservation of bone from adult versus immature individuals, but unfortunately there are not enough specimens in total to indicate the

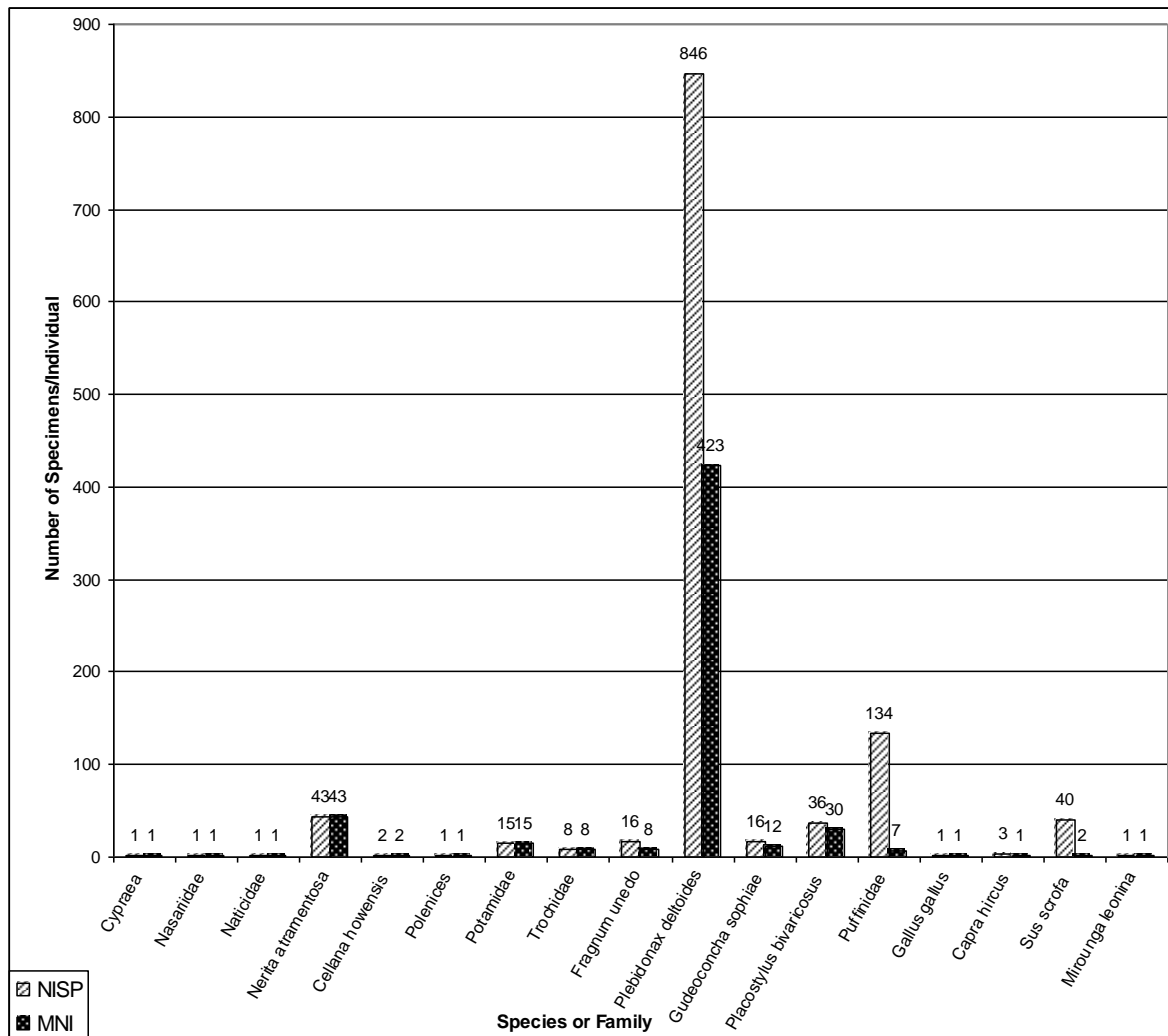


Figure 5.25: NISP versus MNI representations of species abundance in OSBF

presence of individuals of varying ages. Selection processes are a likely contributing factor to this issue and are discussed in following sections.

Economic and Non-Economic Species

The presence of the majority of faunal remains in OSBF can be directly related to human activity; namely the collection, consumption and disposal of animal food sources. The size, frequency and history of consumption in other historic archaeological contexts of marine shells *Plebidonax deltooides* (pipi), *Fragnum unedo* (Strawberry Cockle) and *Nerita atramentosa* (Black Nerite or periwinkle) are clear indicators that these species are of economic significance in OSBF. Other marine species of smaller size and considerably less frequency have several possible origins. The instances of *Cellana howensis* (LHI Limpet) and *Cypraea* (Cowrie family), are possible economic species based on size, but their low frequency indicates they are likely accidental or opportunistic collections while gathering more favoured species from similar habitats, rather than a targeted species. Similarly, *Nasariidae* (dog whelks) and *Potamidae* (mud whelks) could also be accidental collections but are quite small, making them possible natural inclusions in the formation of beach sand dunes in which the site is situated. This process is the likely source of the very small specimens of *Naticidae* (sand snails), *Polenices* (sand snails) and *Trochidae* (top shells) recovered from OSBF. The frequency and fragmentary nature of *Echinoidea* (sea urchin) remains, along with archaeological, historic and modern instances of their use make it likely that the majority of urchin remains at OSBF are a product of human consumption. There is however potential for some urchin remains to originate from natural dune formation, due to the small size and lightweight nature of many of the urchin fragments. Similarly, the few fish remains recovered are likely residues of human activity, but are also potential sand and wind born inclusions.

The presence of Southern Elephant Seal (*Mirounga leonina*) is of particular interest, as LHI lies outside the usual Antarctic and sub-Antarctic range of feeding and breeding seals. Wandering and vagrant individuals, particularly adolescent and elderly males and non-breeding females occur across a much broader range, and have been recorded in more northerly latitudes including the North and South islands of New Zealand, New South Wales, Victoria, South Australia, South Africa, Mozambique, and Brazil (IUCN 2006b; OBIS Sea Map 2006). They are also historically known in Tasmania prior to being hunted out by commercial sealing in the 19th century, and it is not unreasonable to expect that

Southern Elephant Seals, along with other seal species were more frequent occasional visitors to LHI than they are today, prior to the impacts of commercial hunting. This example appears to have been a well utilised opportunistic catch, as the single identified specimen is a large skull fragment which includes part of the zygomatic arch and auditory meatus from a male seal (Groves 2004). The lack of any other skeletal remains in association with it, its discovery in undisturbed cultural deposit and the significant force required to break such heavy bone suggests the skull was broken to access the brain and is likely refuse from a meal, rather than a naturally occurring burial of an expired seal.

Remains from terrestrial shells are harder to identify as being definite food sources. *Placostylus bivaricosus* and *Gudeoconcha sophiae* are two sizable species of land snail that occur with significant frequency in OSBF across all activity zones of the site. The potential for these shells to be self introductions to the site is largely dependant on the nature of the surrounding vegetation of the site during occupation and after abandonment. Both *Placostylus* and *Gudeoconcha* favour semi-closed canopy forest habitats, and while this would have been the naturally occurring vegetation in Hunter Bay prior to settlement, it is unknown how long this vegetation form was maintained after first settlement, nor when the bay flat was cleared to form the modern day cattle pasture (Nomination for listing a native species under the *Environment Protection and Biodiversity Conservation Act 1999*: *Placostylus bivaricosus* 2004). Further, whether this forest was able to reclaim previously cleared areas such as abandoned house sites would influence the likelihood of these land snails travelling across the site prior to its burial by in-blown sand. During occupation it is probable that some buffering vegetation was maintained to shelter houses in an otherwise exposed position, and as such some activity areas such as refuse pits are likely to have been partly vegetated, making it a more favourable area for land snails. The possibility of self introduction cannot be ignored, nor can it be readily resolved due to the incomplete vegetation history of OSBF, and coupled with the attractive size of the snails, their frequency, and instances of land snail consumption, particularly of *Placostylus* elsewhere in the Pacific make it possible that the specimens recovered from OSBF are a mix of wandering snails and the remains of meals (Man and Mollusc 2001).

At first glance remains from *Puffinidae* (Shearwaters) are equally problematic, as shearwaters nested in the bay prior to and during early settlement, and small colonies continue at the extreme ends of the bay today (Hutton 1990). Again, the unknown vegetation history impacts upon the likelihood of remains of birds being from nesting

activities contemporary with the house occupation, and immediately after abandonment. However, unlike the land snails, there is very strong historic evidence of significant exploitation of shearwaters (muttonbirds) as a source of flesh and eggs for food and feathers for export from the very first settlement (Hutton 1990; Nichols 2006; Nicholls 1952; White 1835). Further, the high instance of broken bone, the complete lack of articulated or semi-articulated deposits or clusters of bone representative of one individual, and their almost exclusive occurrence in discard areas, in addition to selection issues discussed in following sections are all suggestive that the vast majority of shearwater remains are from human consumption. The three introduced species present in OSBF, *Sus scrofa* (pig), *Capra hircus* (goat) and *Gallus gallus* (chicken) are all probable remains from consumed animals as indicated by historic sources and the original purpose of their introduction in addition to highly fragmented, non-articulated remains which again occur almost exclusively in discard areas. Possible evidence of portion selection further indicates their economic nature (see following sections).

The majority of remains that can be confidently deemed as ‘economic’ predominantly come from marine sources (see Figure 5.26), and are strongly represented by native species. If the two uncertain species of land snail are included in the tally of economic species, the marine and terrestrial sources have an even spread across the variety

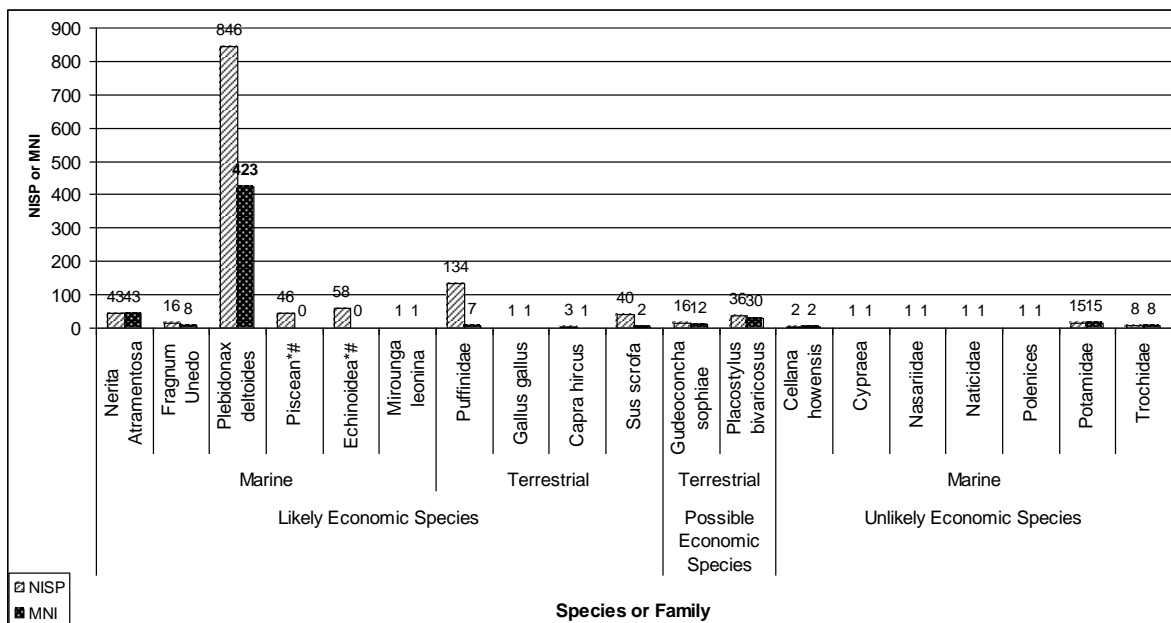


Figure 5.26: NISP and MNI numbers of economic, possible economic and non economic species in OSBF.

*Class groupings rather than species or family groupings.

No MNI available due to lack of diagnostic anatomical elements.

of species/families represented. In terms of frequency, native marine resources are the most strongly represented in the OSBF assemblage, regardless of whether NISP or MNI numbers are used. This dominance of native marine species reflects what historic sources indicate about early resource exploitation on LHI, but is perhaps a bit skewed in favour of marine shell due to its durability and thus good survival in this site compared to the highly fragmentary and largely unidentified mammalian and avian bone. There are also indications that selection processes relating to mammal and avian remains in particular are present and are influencing the overall representation of certain species in OSBF.

Portion Selection

Testing for portion selection was only possible for three groups of bone, as only *Sus scrofa*, *Puffinidae* and unidentified Avian bone had any variation in anatomical elements present. In both mammals and birds, the biggest meat bearing portions are similar, and thus the five groups of skeletal elements are the same for each, even though there is some variation between how much edible flesh is on the least fleshy portions of mammals and birds (for example pig heads, tongue, brain, shanks and trotters are more useable than their equivalent in birds, but are nevertheless the least flesh bearing areas on the animal, and are ranked the same). Therefore, across the three groups there are five groupings of skeletal elements from least fleshy to highest: cranial elements, limb extremities, upper/mid limbs, torso (body) and other. Upper/mid limbs and torso may be fairly equal in yield, depending on the butchering methods used and whether offal such as liver, kidneys and tripe were utilised, which is not known from historic sources or archaeological remains. The other category contains odd bones that can be ascribed to the species but does not have an identifiable location, such as unfused epiphyses.

In *Sus scrofa* (see Figures 5.27 and 5.28) the majority of remains are part of the head portion of the animal, followed by limb extremities, upper/mid limbs, torso and other. The dominance of cranial elements is perhaps a little skewed due to the number of teeth present in each animal and the durable nature of tooth enamel, but the small amount of upper/mid limbs and even fewer torso elements still indicates a trend towards low meat yielding portions being more numerous in OSBF. This suggests that large cuts of meat such as leg, shoulder, loin and ribs were either disposed of in unexcavated sections of the site or are not generally present at OSBF.

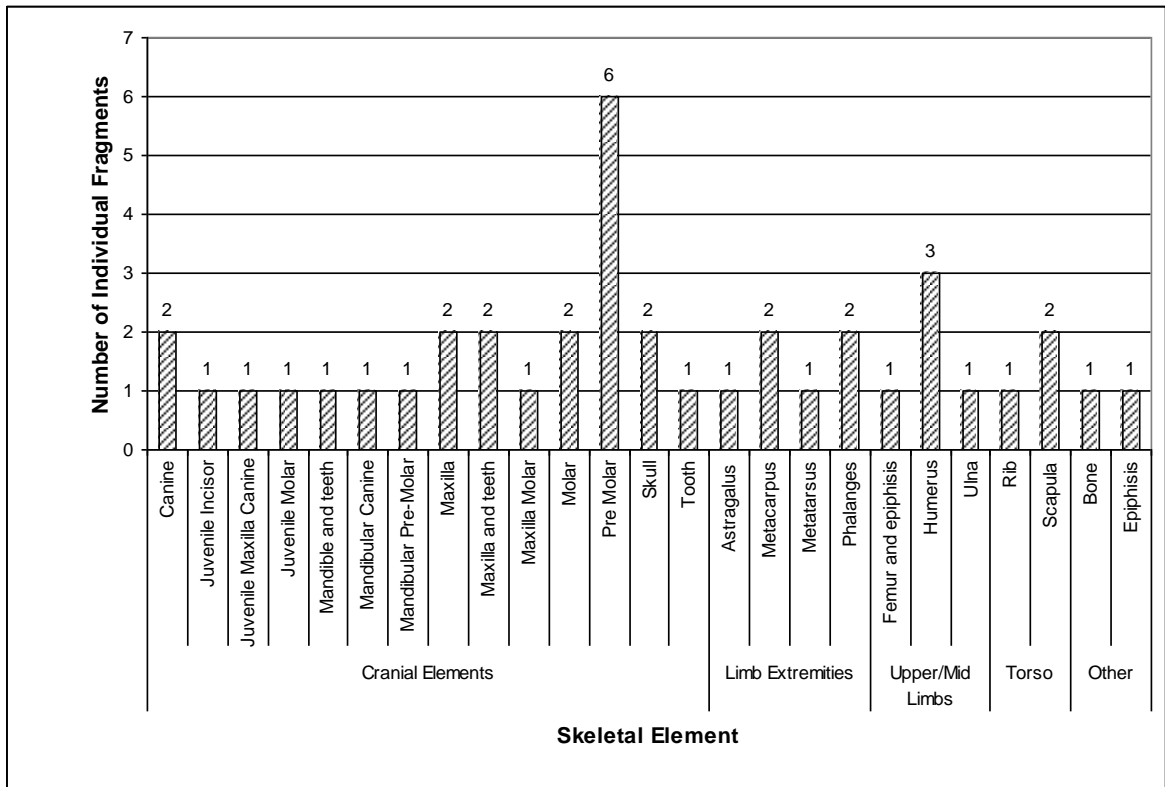


Figure 5.27: Distribution of *Sus scrofa* skeletal elements across different meat bearing areas

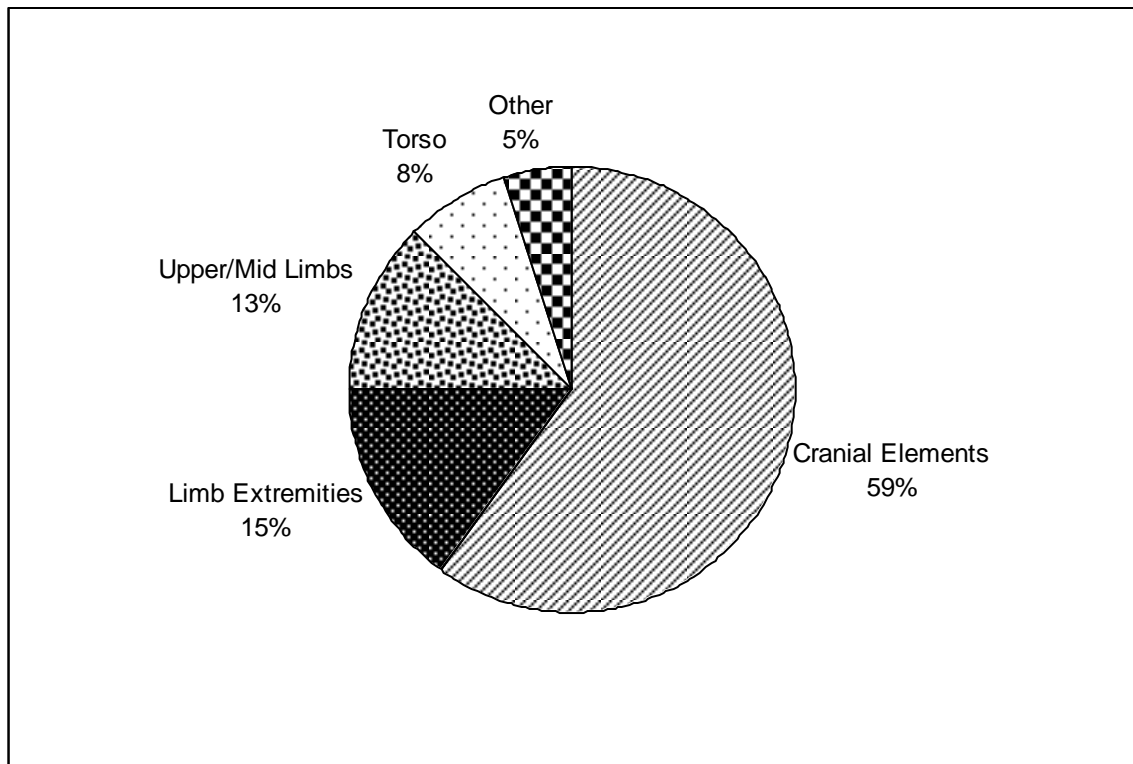


Figure 5.28: Proportion of *Sus scrofa* skeletal elements in different meat bearing areas

The *Puffinidae* remains show a different trend (see Figures 5.29 and 5.30), with cranial elements not accounting for much of the assemblage, while the larger meat bearing areas, upper/mid limb and torso combined account for over half of the identified *Puffinidae* bone. Limb extremities are the largest portion, but this representation is expected due to the large amount of some extremity bones present in one individual, particularly phalanges. Unlike the *Sus* remains, the distribution of *Puffinidae* suggests that more of each individual was disposed of in the site, and perhaps that some of the less meaty portions such as the skull and feet may be under-represented, as these may have been discarded during food preparation in unexcavated portions of the site or informally as the bird was consumed, leaving proportionately more torso bones to be discarded in formal refuse areas following a meal. This trend is even more pronounced in the non-species identified avian bone (see Figures 5.31 and 5.32), with over 80% being from high meat bearing areas, torso and upper/mid limb. As this group of bones are non-species identified, there is potentially a larger mix of species represented, compared to the two currently identified for OSBF. As well as likely *Puffinidae* and *Gallus gallus* remains, there are potentially remains of other domesticated fowl such as ducks (*Anas*) and geese (*Anser*), other nesting sea birds

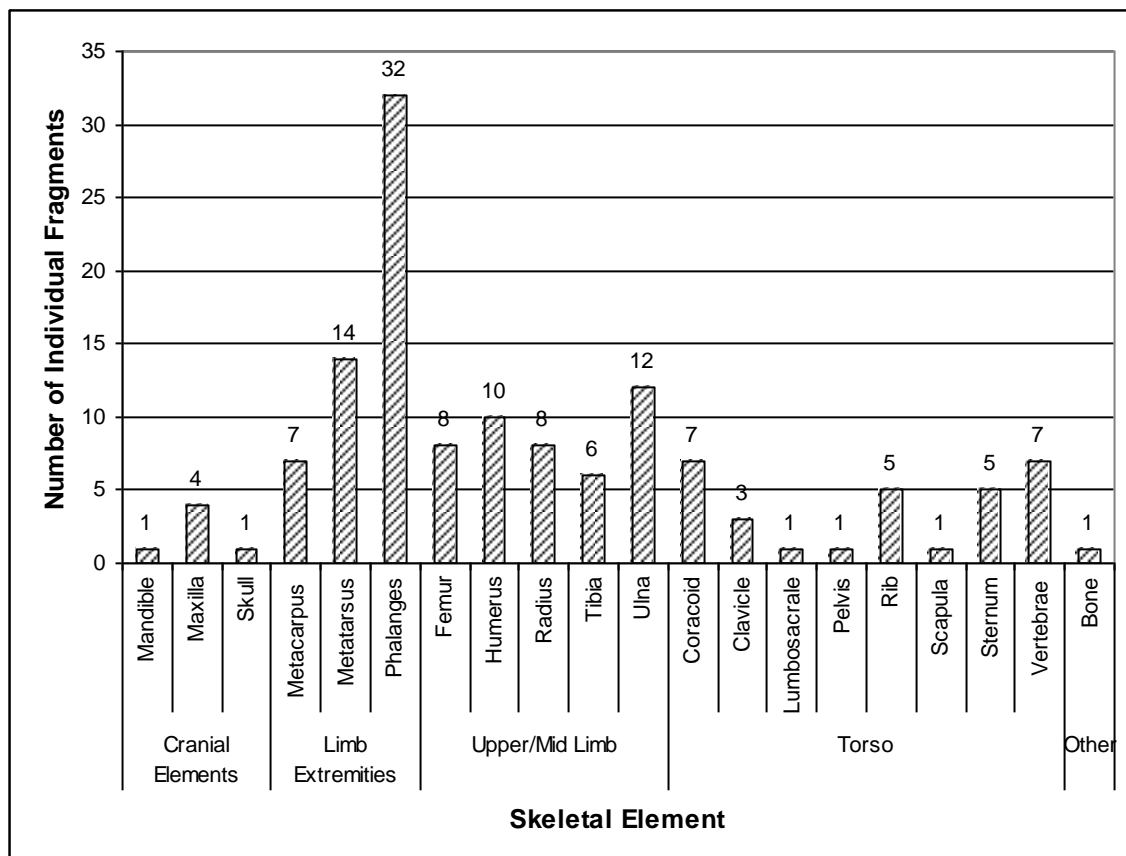


Figure 5.29: Distribution of *Puffinidae* skeletal elements across different meat bearing areas

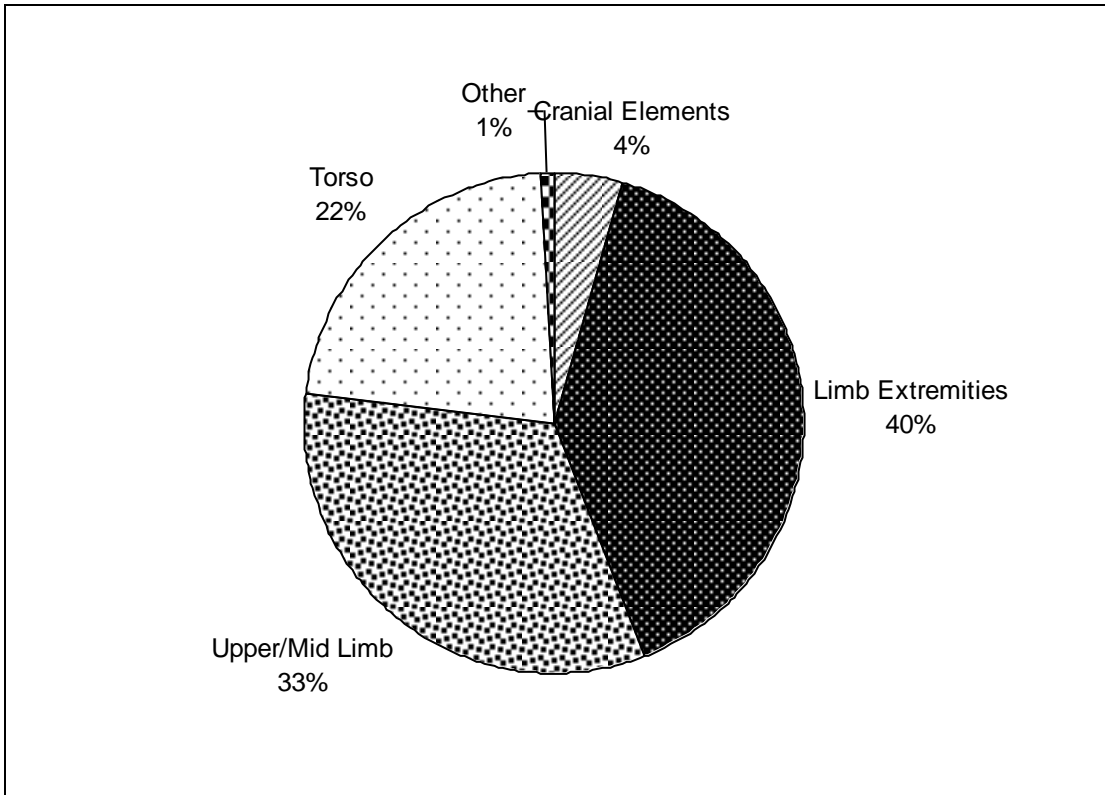


Figure 5.30: Proportion of *Puffinidae* skeletal elements in different meat bearing areas

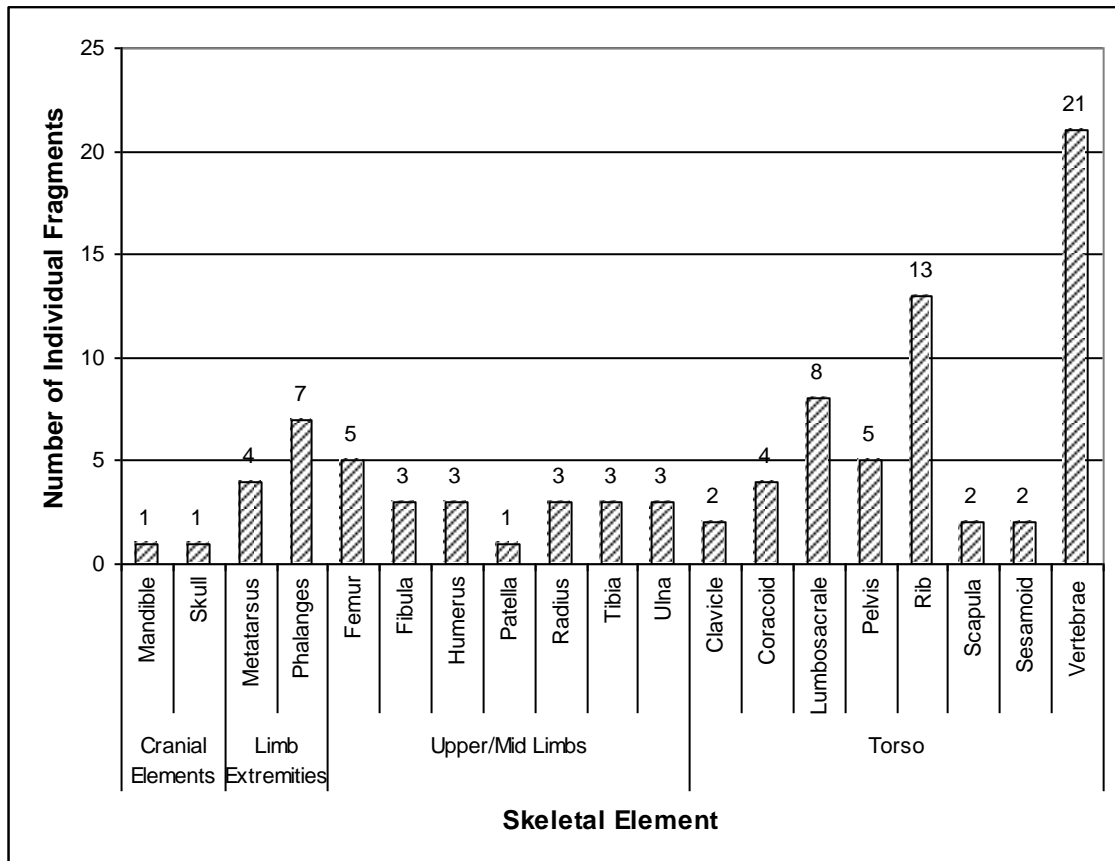


Figure 5.31: Distribution of non-species identified avian skeletal elements across different meat bearing areas

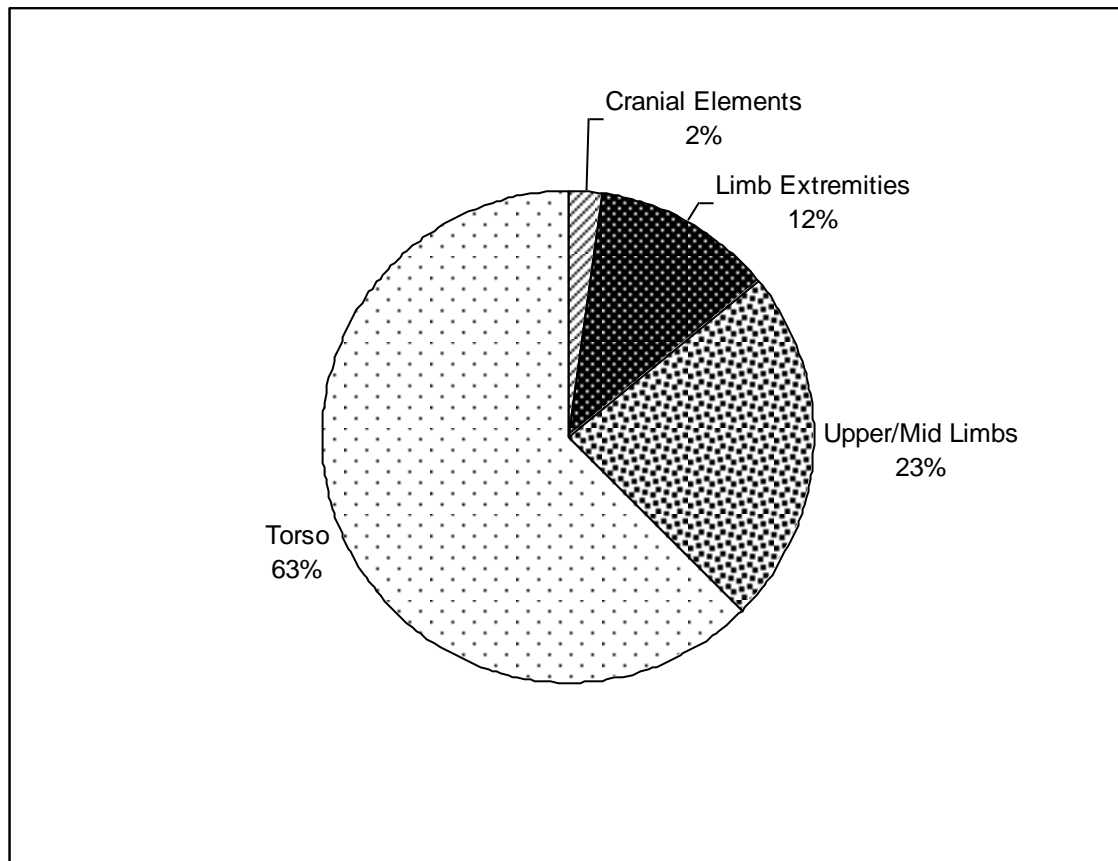


Figure 5.32: Proportion of non-species identified avian skeletal elements in different meat bearing areas

and several species of land bird native to LHI. One very large humerus is likely to be from a Masked or Tasman Booby (*Sula dactylatra* or *Tasmani*), the largest nesting bird on LHI, although it is possibly from an albatross (*Diomedea* or *Phoebetria*) or giant petrel (*Macronectes*), occasional visitors to the island (Groves 2004; Hutton 1990). Despite the possible variation of species present in this sample, the same meat selection processes as those for *Puffinidae* are likely to be at work.

Artefact Dating

As discussed above, a large proportion of the OSBF assemblage is comprised of organic and other fabric types, which are by nature non-dateable in a historic site of such short time depth. Glass, metal and ceramic items are typically dateable, but in the case of OSBF, the vast majority of these assemblages are too fragmentary and are largely non-dateable beyond very broad ranges of time which are almost equal to the entire history of European presence in the Australia/New Zealand region and more specifically LHI. A selection of 22 glass, metal and ceramic items were able to be dated to more contained time

Fab	Artefact	1750	1760	1770	1780	1790	1800	1810	1820	1830	1840	1850	1860	1870	
Gls	Str														
	Str/Btle														
	Btle	Nck													
Mtl	Nail														
Crmc	Plate														

Figure 5.33: Date ranges of 22 artefacts from OSBF.
 Note: Dark grey = period of most common use
 Light grey = period available, not in common use

periods (see Figure 5.33), and interestingly an anecdotal date for one organic artefact was also possible. The largest portion of datable artefacts fall in the metal category and comprise entirely of nails, which have all been identified as hand wrought nails which date from 1788 to the 1850s (Burke and Smith 2004). Glass, which overall is the most numerous of these fabric groups has only nine datable items, comprising two hand blown ground edge stoppers dating from the 1790s to 1850s, one hand blown bottle neck with an in-situ hand blown ground edge stopper also dating from the 1790s to the 1850s and a mix of six bottle necks and bases which have varying date ranges from 1750s to 1850s, 1810s to 1850s and 1820s to 1870s (Boow 1991; Burke and Smith 2004). The one datable ceramic artefact is the blue and white transfer plate piece manufactured by Davenport, whose partial makers mark dates it between the 1810s and 1830s (Borough of Blackburn Museum and Art Gallery 1978; Godden 1999; Hughes and Hughes 1968).

Although the total range of dates spans 120 years, the mean date is 1816.87, the median is 1820 and the mode is 1820/1830 (see Figure 5.34). Given that the earliest possible date of occupation on the site is 1834, these dates generally support the site as the first, or at least very early settlement site on the island. This is further supported by an anecdotal date relating to the Southern Elephant Seal skull fragment. During HMS *Herald's* second visit to LHI during August and September of 1853, MacGillivray, one of

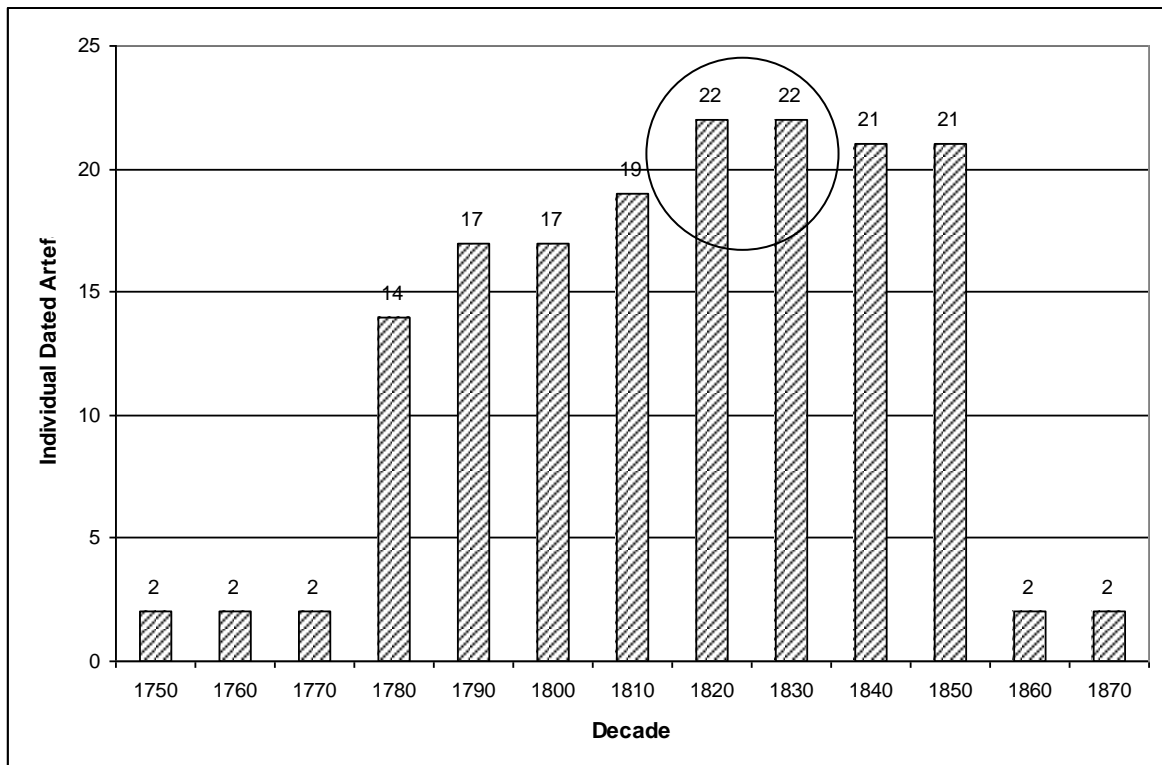


Figure 5.34: Frequency of decades across all dated objects from OSBF, showing the mode at 1820/1830.

the members of the party who landed on the island and stayed for a period to observe wildlife and fauna, wrote an account of a seal being on the island (David 1995):

“He next discovered the remains of a partly decomposed seal, which Andrews had killed a few weeks earlier. The seal’s almost perfect skull was cleaned and carried away as a specimen. From its teeth MacGillivray identified it as a Weddell seal. According to Andrews this was only the second seal to have been killed on the island in the previous fifteen years.” Pg 37

This reference to a seal being killed fifteen years before MacGillivray’s visit in 1853 dates the first known seal killing on island to 1838, and if this reference is correct, it is a plausible record of the same seal whose remains were recovered from the OSBF discard, thus dating at least that part of the site to about 1838. There is a possibility that the OSBF specimen is an earlier, unknown kill, but it seems that seals on LHI even during early settlement were a fairly rare event and therefore noteworthy, making it more likely that Andrews would have known about such an event that happened prior to his occupation on the island from the previous settlers. Further, the fact that the skull of the 1853 seal was ‘almost perfect’ after several weeks of exposure to the elements and scavenging of pigs and dogs confirms the likelihood of the broken skull fragment in OSBF being from a harvested animal, rather than a natural burial.

Other Analyses

Soil pH tests showed a general moderately alkaline matrix across the whole site, with small variation occurring between activity zones, the hearth zone being slightly more alkaline than the remaining areas of the site. This moderate level of alkalinity indicates that bone preservation would not generally have been adversely affected by the soil conditions, and any under-representation of remains such as juvenile pig and fish bone are more likely to be influenced by depositional and taphonomic processes which are not particularly obvious in this site given the uniform stratigraphy and soil pH.

Identification of micro-botanical remains in the clay sample taken from the hut foundation found diatom species that occur in freshwater, including *Cyclotella meneghiniana* and *Nitzschia amphibia* (Finn 2005). The presence of these species strongly suggests that the clay used on the foundation was sourced from the freshwater creek adjacent to the site, which during early settlement ran along the western edge of the

foothills into Hunter Bay, rather than the from the mud flats in the bay which are exposed at low tide.

Discussion

The material evidence recovered from OSBF, while largely fragmentary, informs on several issues relating to the early settlement and occupation of LHI and of Hunter Bay in particular. The discovery of a dwelling foundation and associated deposits containing a range of artefacts has allowed the first examination of an early settlement site on LHI. Evidence relating to the likely builders and occupiers of the hut, daily life, subsistence and indications of trade and recycling behaviours are all present at this site and shall be discussed below.

Construction and Occupation

Observational and sampling evidence from the hut foundation and surrounding environment confirms that the dwelling was constructed from a selection of locally available materials, and perhaps a handful of imported objects. The basalt rocks that form the underfloor of the hut appear to be water rounded cobbles collected from around the bay margin, tidal flats and freshwater creek. The outer course of stone which runs around the outside of the foundation margin are also likely to be locally collected basalt from the bay, surrounding hillsides and bay flat, which may have doubly served to clear stones from land for the house and possibly gardens. Similarly, the stone flags used to line the bottom of the hearth feature are for the most part likely to have also been locally collected, however there is evidence of some outside materials being utilised. At least two large stones that were uncovered in the hearth were of good quality sandstone, a material that does not occur on the island. Sydney sandstone blocks were commonly used as ballast in colonial ships and it is possible that these stones originally came from this source, particularly as there are no accounts of stone being brought to LHI. The three hand-cut calcarenite blocks uncovered in the hearth feature are most likely sourced on LHI, but not necessarily in Hunter Bay. There are some small deposits of calcarenite available at the eastern end of the bay, but larger, higher quality deposits are available at nearby Signal Point and Ned's Beach. For the hearth to be a functional cooking space it is likely that it contained larger quantities of calcarenite blocks as well as pieces of metal for hooks, spits or grills and perhaps sheet metal as part of a flue or chimney (Baglin and Baglin 1979). These materials are now

largely missing from OSBF, and it is possible that this conspicuous absence is due to them being removed and reused at another site. The clay rich mud which forms the surface of the foundation has been shown to have a freshwater source, and therefore most likely came from one or both of the freshwater creeks which occur at the western and eastern end of the bay. Historic evidence suggests that the charcoal residues found in the excavated post holes from burnt support timbers were likely to be cut from local palm, most likely either *Howea forsteriana* (the Thatch Palm) or *Howea belmoreana* (the Curly Palm). Other support timbers were also likely to be cut from these palms, and the entire structure thatched, as discussed earlier. The presence of nails evenly distributed across the site indicate at least part of the structure included nails, either for the larger house construction and/or for the installation and construction of house fittings like hooks, shelves and fixed furniture such as beds, chests, tables, benches or barrels. No direct evidence of house furnishings were uncovered, with perhaps the exception of one cut calcarenite block situated on the floor surface opposite to the hearth and adjacent to the entryway in square E4. This block may be a part of the original chimney construction, but it may also be a footing for some type of furniture in the house, such as a bench or perhaps a bed box or frame. The overall interior layout and furnishings is likely to be akin to that described by contemporary writers describing whaler's dwellings in New Zealand:

“It [the house] is either entirely composed of reeds and rushes woven over a wooden frame, - or else the walls consists of a wattled hurdle made of supple-jack covered inside and out with clay, and the roof is thatched. A huge chimney nearly fills one end of the house; - and generally swarms with natives, iron pots and kettles, favourite dogs, and joints of the whale's backbone, which serve as stools...Bunks with neat curtains line the greater part of the sides of the house. A large deal table and two long benches stand in the middle of the hard earthen floor. The rafters support spare coils of rope, oars, masts and sails, lances, spades and harpoons, and a tin oil-lamp carefully burnished. Two square holes in the wall serve as windows, with wooden shutters for the night. The harness-cask (for salt meat), flour-keg, and water-butt, stand on one side, and a neat dresser, shining with bright tin dishes and a few glasses and articles of crockery, on the other side of the door” (Wakefield 1839 in Lawrence 2006: 46-47).

The length of occupation or changes of occupants in the dwelling cannot be easily determined from the artefact assemblage alone, as dated objects generally stretch across large time spans and all predate the earliest possible occupation of the site. Such broad, overlapping dates render stratigraphic relationships between objects completely irrelevant in terms of identifying and dating phases of occupation or changes between, particularly as

the historic sources indicate that the likely maximum of years of early occupation in Hunter Bay is approximately 20 years (Denham 1853; Nichols 2006; Nicholls 1952; Rabone 1940; White 1835). The number of individuals occupying this site is not evident from the assemblage, nor is gender, age, or single versus multiple group occupations apparent from the material culture. Although the material culture does not definitively indicate that this dwelling is a part of the Ashdown, Bishop and Chapman (ABC) occupation, the history shows it predates at least 1853, the artefact dates indicate an very early occupation date, and given the substantial but simple nature of the dwelling and the large amount paid by the new business partnership that took over in 1841 it is highly probable that this foundation, and the horizon detected under the adjacent mound are the remains of two of their dwellings. The location of these mounds, while occurring at the same end of Hunter Bay, is different to the five huts shown on the 1835 map (see Figure 5.35). However, there is a high possibility that those shown on White’s map were temporary dwellings that were built immediately upon settlement, particularly as White visited only six months after their arrival (Nicholls 1952; White 1835). The new settlers may well have waited for a period to gauge the viability of the provisioning business before investing labour and materials into building more substantial holdings.

Further, among the three couples on the island, upon arrival it is likely there was only one child, belonging to either the Bishops or the Chapmans, as the Ashdowns had all four of their children while on LHI, their first being born two years after their arrival (Nichols 2006). By the time of White’s visit it is probable that a second child had been born, and it appears that the groups good fertility continued, as a later visitor referred to the

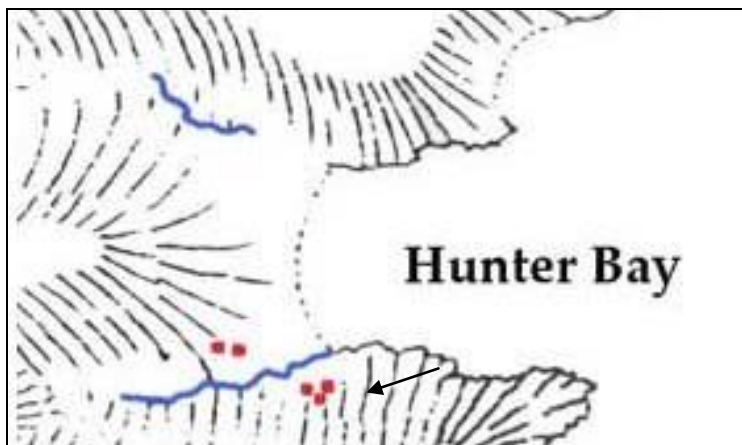


Figure 5.35: After White’s 1835 map showing Ashdown, Bishop and Chapman’s five huts recorded in December 1834. Arrow indicates approximate location of excavated hut foundation and adjacent horizon detected on GPR.

settlers as each having ‘numerous family’ (Anon 1849). The expansion of families may also have been a catalyst for building more substantial houses, and may explain the apparent existence of only two foundations, as families with more children may have moved to larger quarters while perhaps a smaller family and the Maori man either remained in their initial dwellings recorded by White or built less substantial dwellings which can no longer be detected. The presence of two knapped glass artefacts is also a strong indicator that the initial builders were indeed ABC. The presence of one unifacially knapped object, waste flakes and a second object with indications of knapping are highly suggestive of occupation by Polynesians or at least European settlers who have had extended contact with stone tool manufacturers. As such the ABC settlement is by far the most likely candidate for either scenario, given the presence of three Maori women and one Maori man and the years the three Englishmen spent shore whaling in New Zealand and possibly Australia prior to coming to LHI. Other indications of recycling and making do further point to the early settlement age of the hut. Heavily worn bases on reused bottles, two items of knapped glass, the presence of what may be ships copper sheathing in the site, the possible use of ships ballast in the construction of the hearth and the conspicuous absence of other materials that would normally be present in the hearth, are all suggestive of the need and/or inclination to reuse items available on the island.

There is also some evidence to suggest that people of some means occupied the hut at one time, as the presence of good quality Davenport and high fired earthenware ceramics, well made hand blown bottle fragments, necks and ground glass stoppers may indicate ability and/or desire to acquire decent quality items. The presence of good quality but still practical domestic items may be a product of a company equipping employees who are settling on a remote, unoccupied island with objects that are suitably durable for the expected conditions, while the objects are nice enough to brighten the daily existence of people who have voluntarily submitted to isolating and possibly difficult conditions indefinitely on the company’s behalf. This scenario could apply equally to the first settlers, in the employ of Robert Campbell and Co, or to the second group of settlers in the employ of Poole and Dawson. Alternatively, Poole and later partner in the venture, Dr Foulis, both lived on the island during the time of their investment in the supply business, and given the large sum of money paid for ABC’s improvements, it is highly likely that Poole took up residence in at least one of the dwellings for the duration of his stay on LHI. Dr Foulis and his family eventually settled at Windy Point, but probably would have resided at Hunter

Bay with Poole and their employees prior to settling further south. It is possible that these better quality items belonged to either the lone Poole, or Dr Foulis and his family, as both were of sufficient means to be investors and may have brought household items of good quality to LHI.

Subsistence and Trade

All marine and terrestrial food sources historically recorded during early settlement are represented in the faunal assemblage at OSBF, but some species/classes appear to be under-represented, particularly fish. This is notable as LHI has always been known for excellent fishing of both reef and pelagic species, and the first fleet visitors found the fish were so plentiful as to almost literally jump into the boats (Gilbert N.D.) while White's 1835 report specifically mentions fish as being an important food source (White 1835). Differential preservation may be a contributing factor, but a separate processing/discard site for fish is highly probable, as general preservation conditions in the site appear favourable for bone. Goat and chicken also seem to be under represented, along with larger cuts of pig, but this is a probable result of provisioning whale and trade vessels. In addition to vegetables grown on the island, animal foodstuffs were traded with visiting ships, but the exact form these took is not recorded and could consist of a variety of forms. Shipping of pig, goat and poultry livestock would have been highly likely, and this trade could account for the lack of chicken and other domestic poultry in particular. It is highly likely most of the infant settlement's surplus birds would have been absorbed by this trade rather than domestic consumption, leaving only breeding/laying animals on the island. Domestically consumed goat may also have been limited by the demands of the ship trade as their agility and the availability of precipitous mountains would have made hunting them a time and labour intensive activity of uncertain outcome for early settlers. If any reliable supply of goat was available it was also likely absorbed by the provisioning business, as live nanny goats would have been valuable for dairy either on island or as ship livestock. Any pigs traded may have included livestock, but would also have definitely included salted and/or smoked portions of pork. Traditionally larger cuts of meat are smoked and salted, and the large hearth and chimney structure in the hut would be ideal for the smoking of pork as well as fish and birds. The hunting, butchering and preserving of pork for both trade and domestic use would have been a significant activity for early settlers and it is likely that the majority of large, preserved cuts were shipped off island, rather than consumed by the

settlers. This process is a likely cause for the higher occurrence of lower meat bearing pig portions in OSBF, as settlers probably retained smaller portions for their own modest needs, and consumed choicer cuts occasionally when supply allowed.

Native foods such as muttonbird and fish are also probable trade items and the provision of smoked or salted and perhaps fresh fish to ships may also account for the lack of remains in OSBF. Smoked whole muttonbirds and salted eggs were supplied by later islanders to visiting ships, and thus were also a possible trade item during early settlement (Park 1982). Muttonbird and a range of shellfish in particular were important regular food sources for the early settlers, and the potential for other native birds to be present is quite high. The one large bird humerus which is a likely remain from a booby is an interesting hint that any bird of reasonable size might have been exploited by the islanders, at least opportunistically, as was the case with the First Fleet visitors. The Southern Elephant Seal is also an intriguing hint that the occupants of the hut were inclined to and/or needed to take advantage of any food opportunity. The contrast of this behaviour to the instance of the seal killed in 1853 which was left to decompose rather than harvested hints at earlier settlers needing to be more resourceful and/or perhaps having different cultural dietary preferences. This may also be a factor in the dominance of native foods despite the availability of more traditional European foods, as ABC and their Maori companions may well have been more inclined to utilize native foods, especially those familiar or similar to those available in New Zealand than visiting whalers whose crews often entirely came from Britain or America. Thus, if more profit was expected if familiar European foods were available these may have been largely reserved for the provisioning trade while the settlers subsisted primarily on local foods and introduced crops.

Site Formation and Preservation

Even if this site is not part of the holding of the very first colonists on LHI, it is almost certainly the earliest remaining substantial evidence of settlement on the island. Searches for the very first huts recorded by White yielded nothing, and given known and recently observed silting events, no trace of the two huts recorded on the side of the creek are likely to remain, with the three on the hillside proving to be extremely difficult to relocate. Following the abandonment of the dwelling, it is likely that any remaining structures collapsed and a large portion of blown in sand buried the site within a fairly short period, as the absence of mouse (*Mus musculus*) remains in this site suggest that it was

built, abandoned and buried by the time of their introduction from Norfolk Island around 1868 (Etheridge 1889). The presence of charcoal in postholes and in long strips across the clay floor suggest that the hut was at least partially burnt, speeding up the disappearance of the structure. The total time required for the site to accumulate its full 25 to 30cm of sand is unknown, but is likely to have been fairly short before the introduction of pasture grass to the area stabilised the dune surface and prevented any further accumulations of sand. Disturbance to the site after abandonment is not overly apparent, and potential water erosion is very limited as the foundation is sufficiently distant from the creek and lies behind the first dune above the high tide mark. Faunal disturbance is probably limited to potential scavenging and trampling in refuse areas by pigs and dogs, which may have contributed to the fragmentation the faunal assemblage, and the lack of smaller remains such as those from fish and poultry; but no overt evidence of gnawing was found on any of the bones examined. Human disturbance may have included revisiting the site to retrieve items for re-use, but generally any disturbances to the site appear to have been limited to before its complete burial, upon which the site shows no signs of being disturbed until excavation in 2004.

In summation, the artefact assemblage and building remains discovered at OSBF indicate that this was a simple but sturdy and comfortable dwelling built by early settlers on LHI, most likely from the ABC group, which was occupied for a number of years. There may have been at least two different phases of occupation by successive settlers, and occupants brought with them and/or had access to a selection of everyday objects common to the period such as clay tobacco pipes, black beer bottles, clear apothecary style bottles, hand made bone buttons, blue and white transfer and dipped earthenware ceramics. The settlers were inclined to regularly utilise a range of native foods available to them including different types of shellfish, fish, urchins, seabirds, feral game and probably opportunistic finds such as the Southern Elephant Seal. Introduced foods were also utilised, but with less regularity and may have been reserved and prepared for trade with visiting ships, particularly during early settlement. They were also inclined to recycle household goods and raw materials for different applications, and may have bartered for second hand goods from ships for re-use. The exact date of construction cannot be definitively identified, but the broad use of native foods, recycling behaviour and efficient exploitation of food sources suggests both a smaller, less established and more isolated group of people and an environment that has economic quantities of faunal and floral resources remaining in easily

gathered locations: specifically the ABC settler group which included four adult men and three adult women during a seven year occupation.

Perry Johnson’s Land

Fabric Quantity

Basic sorting of the PJJ assemblage into the basic fabric categories discussed previously revealed again the importance of organic materials (see Figure 5.36), with this category accounting for 2454 pieces (53%) of the total artefact count for the site and being the second most weighty at 747 (30%). Metal also features very strongly on this site, with it accounting for the most weight in the assemblage, at 868grams (35%) and being the second most numerous at 147 pieces (31%). The following categories are more mixed in their weight/count ratios with ceramic, other, glass then composite descending by weight, whereas by count the categories descend from other, glass, ceramic then composite. These slightly more mixed ratios are partly a result of very different fragment sizes between excavated remains and surface collections, particularly in the ceramic category and the large amount but relatively lightweight nature of charcoal which falls in the other category, and occurs throughout most excavation features on this site. The disparity in fragment sizes is quite marked, with surface artefacts being an average 7.71 grams in contrast to excavated objects weighing on average 0.44 grams.

SQ	GLASS		METAL		CERAMIC		ORGANIC		COMPOSITE		OTHER		TOTAL	
	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt	Wgt	Cnt
1	7	10	34	70	17	7	77	246	0	0	252	155	387	488
2	1	2	7	22	33	7	60	305	0	0	1	1	102	337
A1	2	6	165	153	12	7	123	235	0	0	15	35	317	436
A2	2	5	294	289	33	15	140	573	0	0	10	40	479	922
B2 (3)	28	81	138	557	9	10	270	1001	0	0	20	281	465	1930
C1	2	3	171	335	9	2	22	39	0	0	10	6	214	385
C2 ST	0	0	34	3	0	0	28	19	0	0	1	1	63	23
SP 2	0	0	0	0	2	1	1	1	0	0	0	0	3	2
SP 4	0	0	0	0	0	0	6	30	2	1	0	0	8	31
SS1	110	11	0	0	16	2	0	0	0	0	0	0	226	13
SS2	56	13	1	1	136	32	4	1	0	0	0	0	197	47
SS3	26	17	24	40	92	31	16	4	0	0	0	0	158	92
s bottle	600	1	0	0	0	0	0	0	0	0	0	0	600	1
TOTAL	234	148	868	1470	359	114	747	2454	2	1	309	519	2619	4706

Figure 5.36: Total fabric weights and counts for each excavation square, shovel pit and surface scatter at PJJ

Artefact distribution

The matrix that was revealed across all excavated square was completely identical, with the exception of the clay rich soil encountered in square one as discussed in the previous chapter. Grey sandy soil throughout successive spits, terminating in yellow sand and sand conglomerate was encountered in every square excavated at similar depths except where previously discussed in C1. The artefact densities encountered in each spit also roughly corresponded between most squares, with the exception of square one and C1. Spit three in all other squares consistently produced the most artefacts by weight and count (see Figures 5.37 and 5.38), and it seems certain that this depth corresponds with the most intensive depositional period of occupation. The exception of square one is due to the disturbed nature of the square and the inflated depth of the excavation by about 10cm by the addition of the foreign clay rich soil in the top two spits. This not only introduces artefact material that is not in its original deposition in at least spits one and two, it buries matrix in spit five that would normally be roughly contemporary in depth to spit three in other squares, spit five in square one being where the majority of individual items occur. Square C1, as discussed earlier, appears to be compacted in depth, stratigraphy and artefact distribution due to the very shallow occurrence of the sand conglomerate, making stratigraphic comparisons from C1 very difficult.

Excavated squares appear to comprise floor, underfloor or sweep zone deposits due to the consistency of fragment size, range of materials and stratigraphy across the excavated squares. Consequently, it seems certain that none of the excavated features include discreet discard deposits. Interestingly, the total count of material recovered from square B2 is significantly higher than any other square (see Figures 5.39), the majority of which is from organic remains. Some of the organic finds consisted of the largest bone fragments recovered from anywhere in the site, eight of which were found in direct association with portions of iron wire bent in rough hook shapes. The occurrence of two iron fish hooks in B2, plus the significantly higher frequency of metal objects such as nails, wire and ammunition in B2 and the adjacent grided squares (89%), in conjunction with bone and wire may suggest this deposit is part of an underfloor feature from a building which possibly housed some kind of meat smoking or butchering activity. This is further supported by the concentrations of charcoal in B2 in particular; while charcoal is present across most of the site, the vast majority (83%) occurs in B2 and in spits three and five in

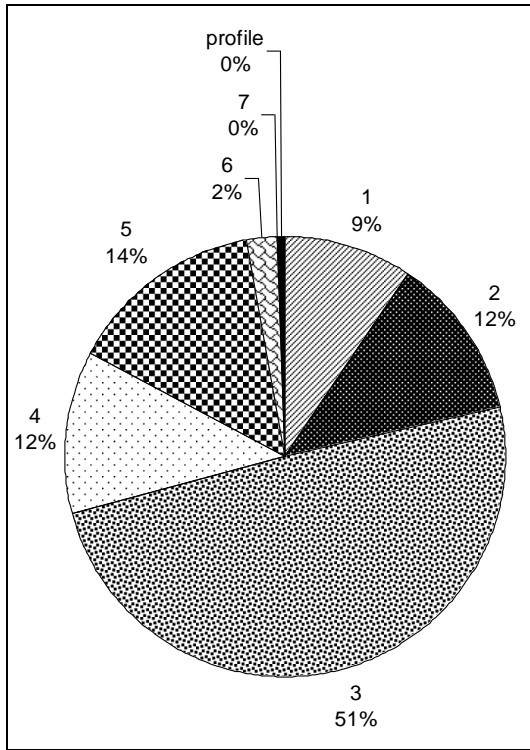


Figure 5.37: Summary of total excavated artefact distribution by weight across excavation units (spits and profile collections)

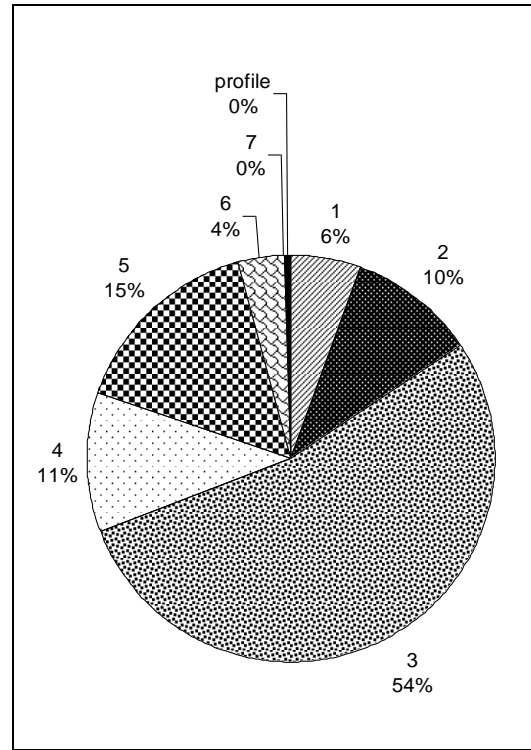


Figure 5.38: Summary of total excavated artefact distribution by count across excavation units (spits and profile collections)

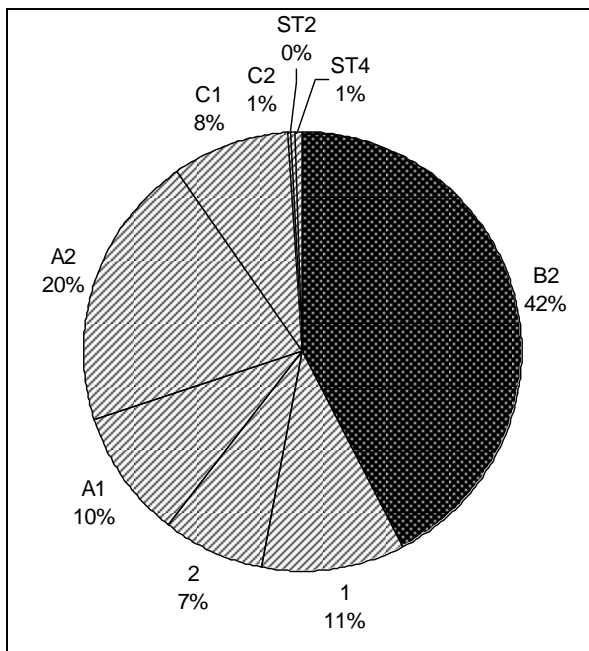


Figure 5.39: Distribution of total excavated assemblage by between B2 and all other excavation units (including shovel pits)

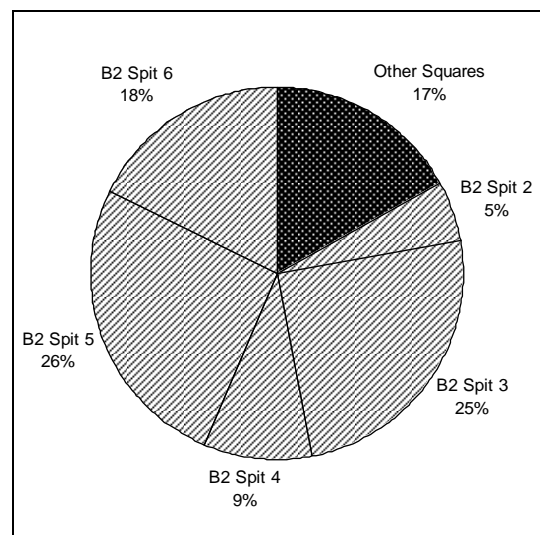


Figure 5.40: Distribution of charcoal between B2 and all other excavated squares

particular (see Figure 5.40). Larger numbers of artefacts in these squares in general suggest a highly frequented activity area, but the concentration of hardware items and faunal material in conjunction with hand cut calcarenite blocks that appear to be foundation stones for a small area of timber flooring suggest a shed or combined shed and kitchen rather than an additional dwelling site. These blocks and concentrations of artefacts constitute the only discernable evidence of some form of activity area, but this definition is tentative at best and not sufficiently strong enough to enable assemblage interpretation based solely on its distribution.

Functional Quantities

Glass from the PJJ assemblage falls into eight artefact categories (see Figure 5.41) with the majority being generic bottle/jar/glass fragments, most of which are associated with eating/drinking or medicinal functions. Approximately 36 pieces were non-diagnostic and came under the unidentified category. A couple of items of interest were included in the glass items, and all are indicators of greater means to acquire slightly better quality household items. Three glass beads of two different types (see Figure 5.42) were recovered and are the only PJJ and LHI example of artefacts that have little or no practical value and have a purely decorative function. A small milk-glass button (see Figure 5.43) does have a practical application, but is of greater aesthetic value than the bone and metal examples also recovered from PJJ. The last example are two small fragments of fine hand-blown clear etched glass from either a wine glass or tumbler, which again has a practical use but is of greater quality than average household items for everyday use.

The metal assemblage from PJJ comes under 16 artefact types (see Figure 5.44), the majority of identified items being classed as nails, followed by nail/wire and wire categories. The unidentified category accounts for 1168 individual items, but most of these are small flakes of corroded iron, or longer pieces of corroded metal which cannot be distinguished as a nail, wire or similar item.

Artefact		Activity		Use	
Bead	3	Adornment	3	Apparel	1
Bottle	9	Drinking	8	Drink Service	4
Bottle/Jar	21	Eating/Drinking	7	Drink Service/Storage	4
Bottle/Jar/Glass	60	Eating/Drinking/Medicinal	79	Food/Drink Service/Storage	7
Button	1	Fastener	1	Food/Drink/Medicine Service	73
Drinking Glass	4	Structural	14	Food/Drink/Medicine Service/Storage	6
Glass Pane	14	Unidentified	36	Unidentified	44
Unidentified	36			Window	9
Total	148		148		148

Figure 5.41: Artefact type, activity and use categories represented in the glass assemblage from PJJ

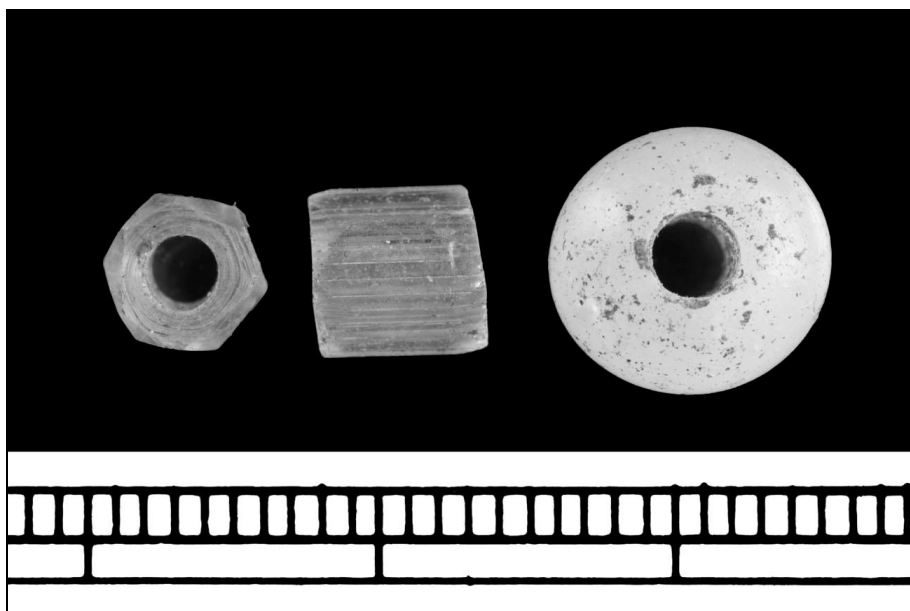


Figure 5.42: Three glass beads excavated from squares 1 and 2



Figure 5.43: Two bone and one milk-glass buttons recovered from surface scatter 3, B2 and square 2 respectively

The PJJ ceramics cover 12 different artefact types (see Figure 5.45), with the very generic category of hollowware, which applies to any shard that has sufficient curve to indicate it is from a ‘hollow’ vessel, accounting for the majority of fragments. Pipes are the next most numerous category, followed by plates. Approximately 20 non-diagnostic objects come under the unidentified category. The majority of ceramics come from surface scatters and are primarily white glazed earthenware or plain white porcelain. Excavated ceramics are mostly blue and white transfer of varying patterns including willow and Asiatic pheasants (see Figures 5.46 - 5.48). Three pieces of flow blue were recovered, (see Figure 5.49) along with one of Mocha ware (see Figure 5.50) and one of banded annular ware (see Figure 5.51). Pipes are mostly unmarked stem pieces or non-diagnostic bowl fragments, but two pipe stems bearing makers marks were recovered, one marked

Artefact		Activity		Use	
Bird Shot	2	Building/Maintenance	1	Ammunition	2
Button	3	Defence/Hunting	2	Apparel	5
Clothing Hook	1	Fastener	4	Fishing	2
Eyelet	1	Fittings	2	Gun Ignition	2
File	1	Food Preserving?	6	Meat Smoking?	6
Fishhook	2	Food Procurement/Leisure	4	Unidentified	1452
Nail	110	Structural	110	Wood/Metal Working	1
Nail/Wire	30	Unidentified	1342		
Percussion Cap	2				
Shoe Heel	1				
Strip	2				
Strip with Nails	1				
Tube	1				
Unidentified	1168				
Wire	144				
Wire Hook	1				
Total	1470		1470		1470

Figure 5.44: Artefact type, activity and use categories represented in the metal assemblage from PJJ

Artefact		Activity		Use	
Bowl	4	Drinking	1	Drink Service	1
Bowl/Cup/Jug	3	Eating	25	Food Service	25
Bowl/Cup/Jug/Canister	1	Eating/Drinking	50	Food/Drink Service	15
Cup	2	Leisure	19	Food/Drink Service/Storage	33
Flatware	8	Unidentified	19	Smoking	19
Handle	1			Unidentified	21
Hollowware	37				
Jug/Cup	2				
Pipe	19				
Plate	16				
Plate/Bowl	1				
Unidentified	20				
Total	114		114		114

Figure 5.45: Artefact type, activity and use categories represented in the ceramic assemblage from PJJ



Figure 5.46: Selection of blue and white transfer-ware from a teacup, and two plates

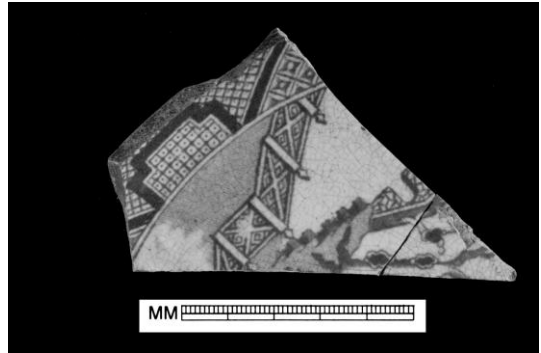


Figure 5.47: Large piece of willow pattern transfer-ware plate



Figure 5.48: Medium piece of Asiatic pheasant transfer-ware plate

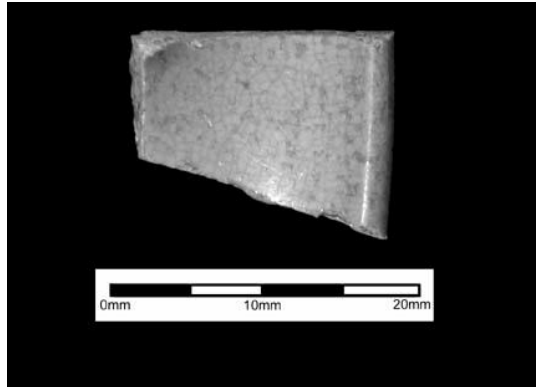


Figure 5.49: Small piece of flow blue rim from a large 'breakfast cup'

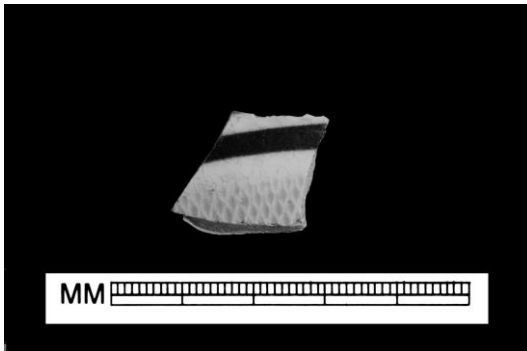


Figure 5.50: Small piece of banded decoration from a mocha hollow vessel

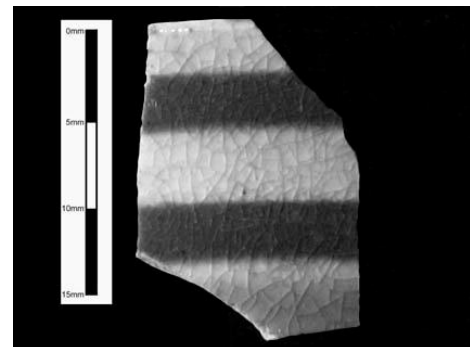


Figure 5.51: Small rim fragment of banded annular ware from a hollow vessel

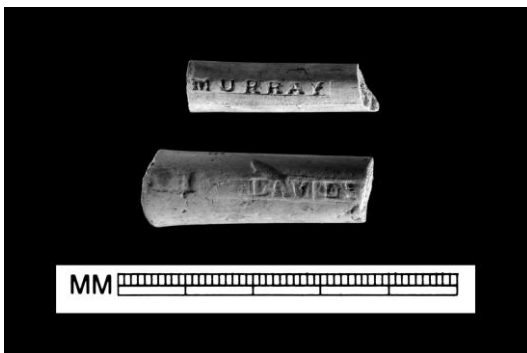


Figure 5.52: Two marked pipe stems, the top marked 'Murray' and the bottom marked 'Davidson'

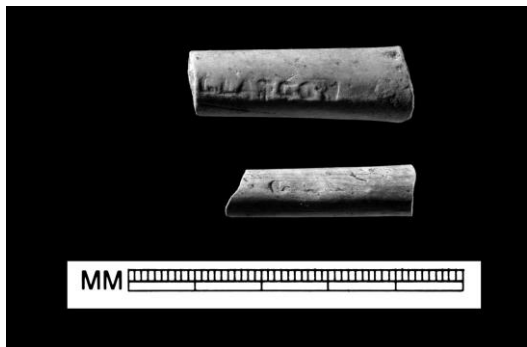


Figure 5.53: Reverse of pipe stems showing 'Glasgow' on the Davidson pipe and the remains of a similar mark on the Murray pipe

‘Murray’ and another marked ‘Davidson’ on one side and ‘Glasgow’ on the reverse (see Figures 5.52 and 5.53).

The other category at PJJ comprised of a mix of charcoal, bitumen, and ash. Charcoal occurs in most undisturbed excavated squares; bitumen is present in the top four disturbed spits of square one and is obvious infill from road construction; and ash appears occasionally in different excavation units with no apparent association with charcoal concentrations or other discernable activity. Charcoal appears to be supporting evidence of a possible activity area, as discussed above, but as with OSBF, has little interpretative value outside its distribution.

The PJJ assemblage included one instance of a composite artefact, which was recovered from a surface scatter. The item is a heavily corroded iron and wood artefact, but the metal and timber are so degraded from exposure to the elements it is impossible to identify, and has been ascribed as unidentified. It is possibly from any number of wooden handled metal objects like knives, saws, files, screwdrivers or brushes to some type of structure such as a tea-chest, wheel barrow, bucket or barrel, which are just a few examples.

As with OSBF, the organic PJJ assemblage is predominantly from faunal remains, with a small collection of other materials. Seeds account for nine items, five are unidentified, and four buttons make up the remaining assemblage. Two of the buttons are bone (see Figure 5.43), while the other two are small shell buttons, which again are slightly

Class		Anatomical Element		Species or Family	
Echinoidea (Sea Urchins)	14	Bivalve	18	Conidae (Cones)	1
Mammal	44	Bone	1	Cypraea (Cowries)	3
Mollusc (Shells)	98	Canine	2	Nerita atramentosa (Black Nerite)	14
Piscean (Fish)	1	Gastropod	35	Nerita plicata (Plicate Nerite)	1
Unidentified	2288	Incisor	10	Fragnum unedo (Strawberry Cockle)	2
Monocotyledoneae (Palms)	5	Longbone	3	Plebidonax deltoides (Pipi)	15
		Mandible and teeth	1	Tridacnidae (Clams)	1
Artefact		Molar	17	Gudeoconcha sophiae (Round Land Snail)	3
Button	4	Pod	4	Placostylus bivaricosus (Conical Land Snail)	14
		Pre Molar	6	Puffinidae (Shearwaters)	31
		Rib	2	Gallus gallus (Chicken)	19
		Seed	2	Mus musculus (Mouse)	6
		Shell	45	Bos taurus (cow)	1
		Tooth	4	Capra hircus (Goat)	7
		Unidentified	2285	Sus scrofa (Pig)	51
		Urchin shell	14	Unidentified	2281
		Vertebrae	1		
				Use	
		Activity		Apparel	4
		Fastener	4		
Total	2454	Total	2454	Total	2454

Figure 5.54: Class, anatomical element and species/family identifications for the PJJ organic assemblage

more decorative than the usual bone or metal buttons more commonly used for everyday clothing. The remainder of the organic assemblage falls into six classes, with unidentified being the most numerous, followed by mammal, mollusc, piscean, echinoidea and monocotyledoneae (palms). These in turn fall into 17 anatomical and 16 species or family groups (including unidentified in both) (see Figure 5.54).

Minimum Number of Individuals

The value of MNI analysis is as limited for the PJJ faunal collection as it was for OSBF, and this is due to the same factors; highly fragmented bone that is difficult to identify on a detailed level; a general lack of diagnostic features on urchin and bivalve remains; and too small a sample of identified material to provide a meaningful measure of subsistence when reduced by MNI. These issues are further compounded in PJJ as the fragmentation of faunal remains is greater than at OSBF (see Figure 5.55), reducing the value of MNI even further. Both mammal and avian bone are very fragmentary, with the only examples of in-tact bones being very small specimens from either *Mus musculus* (mouse) or phalanges from *Gallus gallus* (chicken) and *Puffinidae* (shearwaters). As with OSBF, MNI for mammals and birds can only be calculated by dividing the NISP of the most frequently occurring anatomical element by the number present in an individual. Shell is in better condition (see Figure 5.55) and as before gastropod individuals can largely be identified due to their singular shell, while bivalves are calculated by dividing the NISP by two. Fish and urchin remains are again problematic as they are very fragmentary (see Figure 5.55) and anatomical and species identification was not possible, thus neither have MNI calculated.

The limitations of MNI for the PJJ assemblage become apparent when comparing the NISP and MNI, as in most cases the MNI completely reduces the frequency of most vertebrate species to one or two (see Figure 5.56). MNI almost completely negates any trends evident among the vertebrate species, but it does generally confirm the frequency of

Bone			Shell			Urchin Shell		
Weight	Count	Average Fragment Weight (grams)	Weight	Count	Average Fragment Weight (grams)	Weight	Count	Average Fragment Weight (grams)
512	2223	0.23031	233	158	1.47468	10	21	0.14285

Figure 5.55: Averaged weights for different organic artefacts from PJJ showing varying degrees of fragmentation

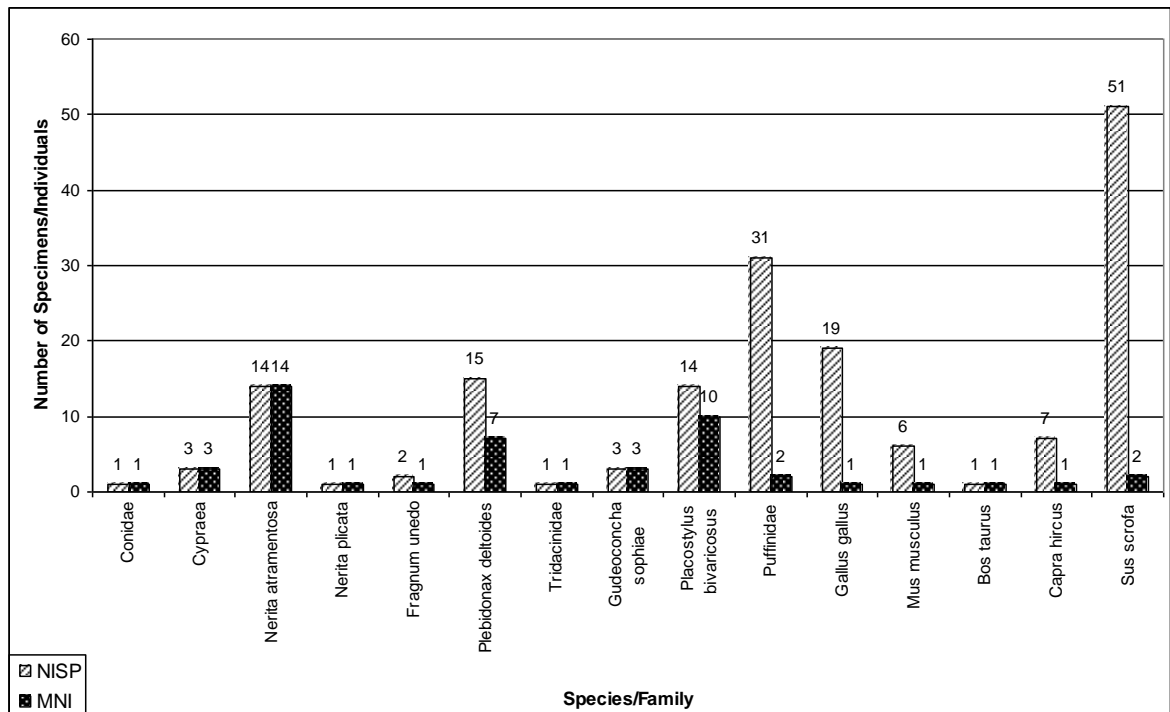


Figure 5.56: NISP versus MNI representations of species abundance in PJJ

molluscs in the assemblage. Marine molluscs *Plebidonax deltoides* and *Nerita atramentosa* are both represented well, as is terrestrial *Placostylus bivaricosus*. Looking at the NISP representations of species *Sus scrofa* is particularly well represented; many of the anatomical elements present for *Sus* are teeth, which interestingly inflate the overall representation of pig while at the same time, indicate that more than two individuals are present, as suggested by MNI. As with OSBF, a range of teeth from different age animals are present, ranging from infant, juvenile, sub-adult and elderly specimens but the sample is too small to calculate how many of each age individual might be present. *Capra hircus* is represented entirely by teeth, but the sample is too small to differentiate varying stages of wear on teeth, and may well represent only one individual. Both *Gallus gallus* and *Puffinidae* are also well represented in the NISP measure, but as both species are represented by a broad range of anatomical elements, it is possible that the MNI measure is correct, but this is unlikely.

Economic and Non-Economic Species

The majority of the faunal assemblage from PJJ can be attributed to the economic collection, consumption and discard of animal remains. As discussed previously, *Plebidonax deltoides* (Pipi), *Fragnum unedo* (Strawberry Cockle), and *Nerita atramentosa*

(Black Nerite) are highly likely economic species, while new additions *Nerita plicata* (Plicate Nerite) and *Tridacnidae* (Clams) are probable economic collections, but are possibly opportunistic catches rather than a targeted species. The three *Cyprea* (Cowries) and one *Conidae* (Cones) have several possible origins as the specimens of both types of shell are too big to be likely wind born inclusions; the cowries may be opportunistic economic collections or possibly the result of hobby collecting while the cone shell is almost definitely not an economic catch given its venomous nature and is a possible hobby collection. Fish and urchin remains in PJJ are also likely residues of human consumption, particularly as fish has one of the highest frequencies in PJJ and the supporting evidence of fish hooks and historical accounts. No reference is made to the use of urchins in any of the historic sources but given the likely consumption of them during early settlement and their relatively high frequency in PJJ, urchins are a likely food source. The distance of the PJJ site from the shore and the stable nature of the dune greatly reduce the likelihood of lightweight remains like urchin shell and fishbone being wind borne introductions.

The question of the economic nature of the two species of land snail *Placostylus bivaricosus* and *Gudeoconcha sophiae* remains, and is as equally tricky to resolve in PJJ as it is in OSBF. Both species occur across several excavation squares, primarily in squares one, two and A2 which are all possible underfloor deposits from a dwelling or auxiliary building. Depending upon the height of the floors in question, it is entirely possible that the snails self introduced themselves to the site, but the likelihood of this is influenced by the surrounding vegetation. Prior to human settlement the native forest regime on PJJ would have been suitable habitat for both species, but historic records indicate that upon occupation by the Johnsons (if not before), the area surrounding the dwelling site was cleared and surrounded by pasture, as seen in the photographs taken during the 1882 commission (see Figure 5.67 and 568). The potential for the snails to be naturally occurring aspects of site formation cannot be ignored, but the possibility of such a large, easily harvested resource being utilised, at least on occasion is also worth consideration. The high occurrence of *Puffinidae* remains in PJJ strongly suggests that shearwaters were an economically exploited species, with the nearest significant breeding colonies located approximately 500m away. Four of the five introduced species present at PJJ, *Bos taurus*, *Capra hircus*, *Gallus gallus* and *Sus scrofa* are all probable economic species, despite the low representation of *Bos* and *Capra*. The fifth introduced species *Mus musculus* is a feral

pest rather than an economic animal and its presence is a result of self introduction rather than direct human agency.

Of the species that can be confidently deemed ‘economic’, seven species are marine and five are terrestrial (see Figure 5.57), with an almost equal amount of specimens split between the two categories suggesting a fairly equal exploitation of land and sea resources. The general selection of both native and introduced species match fairly well historic source information on available imported livestock and local resources, but again goat appears to be under-represented in reference to their apparent importance throughout settlement, from 1834 to at least the 1950s.

Portion Selection

As with OSBF, three groups had sufficient anatomical range to test for portion selection, *Sus scrofa*, *Puffinidae* and unidentified Avian bone, and as discussed previously, each species/group has the same hierarchy of meat bearing portions; cranial elements, limb extremities, upper/mid limbs, torso and other. In *Sus scrofa* (see Figure 5.58) cranial elements dominate, with limb extremities and upper/mid limbs only

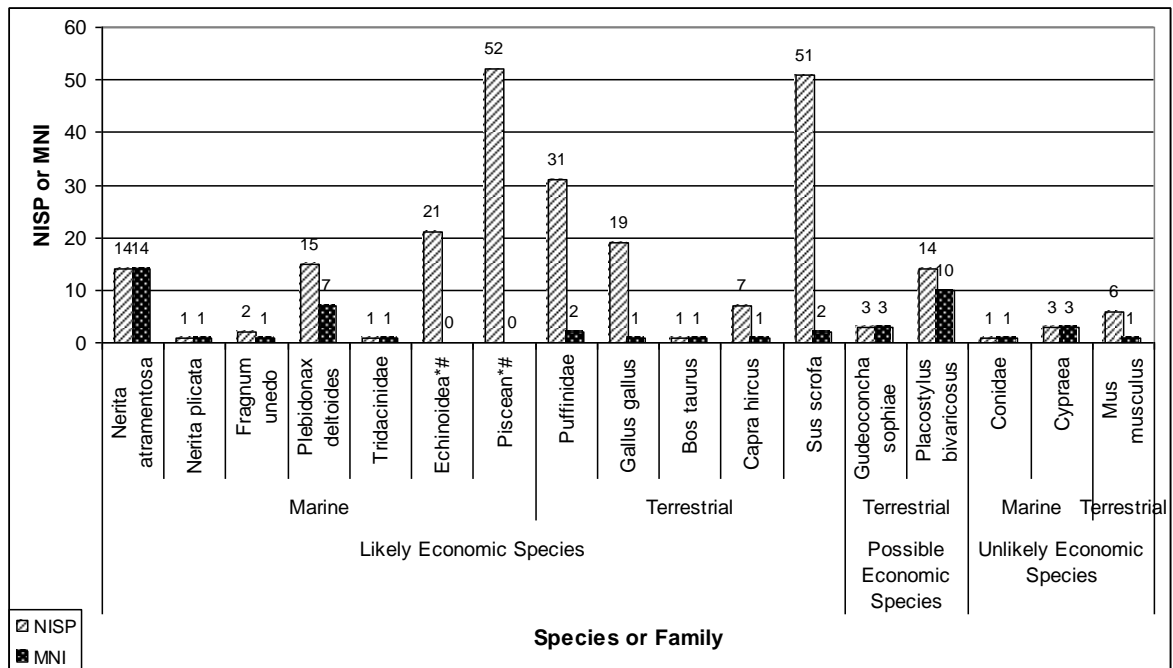


Figure 5.57: NISP and MNI numbers of economic, possible economic and non economic species in PJJ

*Class groupings rather than species or family groupings

No MNI available due to lack of diagnostic elements

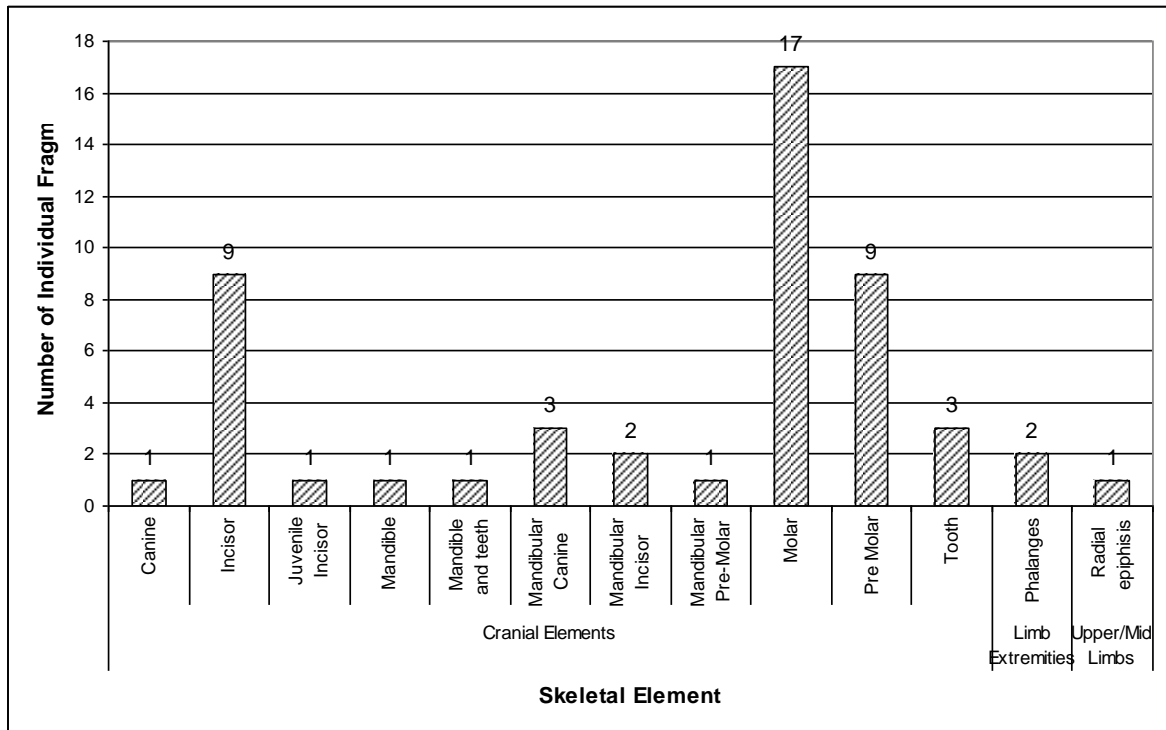


Figure 5.58: Distribution of *Sus scrofa* skeletal elements across different meat bearing areas

accounting for one item each. With the exception of one fragment of mandible, all the cranial pig remains are teeth, and as previously discussed, the number of teeth available per individual animal and the durability of the teeth may skew the ratios of cranial to other skeletal elements, but in this case the complete lack of any other remains is still telling of a general pattern of larger meat bearing cuts being absent from this assemblage.

In contrast, the *Puffinidae* remains show a much more even distribution of remains across all meat bearing portions except cranial elements (see Figures 5.59 and 5.60). Limb extremities account for the largest portion of remains, but this is somewhat to be expected due to the high number of phalanges present in each individual. The general range of skeletal elements is what might be expected if all or most of an individual was being disposed off, rather than selected portions, and the lack of cranial parts may reflect the separate disposal of the head during either procurement of the birds or meal preparation, while the remainder of the carcass was disposed of together after consumption. A comparable trend is evident in the non-species identified avian remains (see Figures 5.61 and 5.62), which shows a very similar spread of skeletal elements across the different portions, with the exception of two cranial pieces being present. As this group are non-species identified, there is potentially a mixed selection of birds present, including introduced poultry such as duck, goose and turkey as well as more chicken, shearwaters and

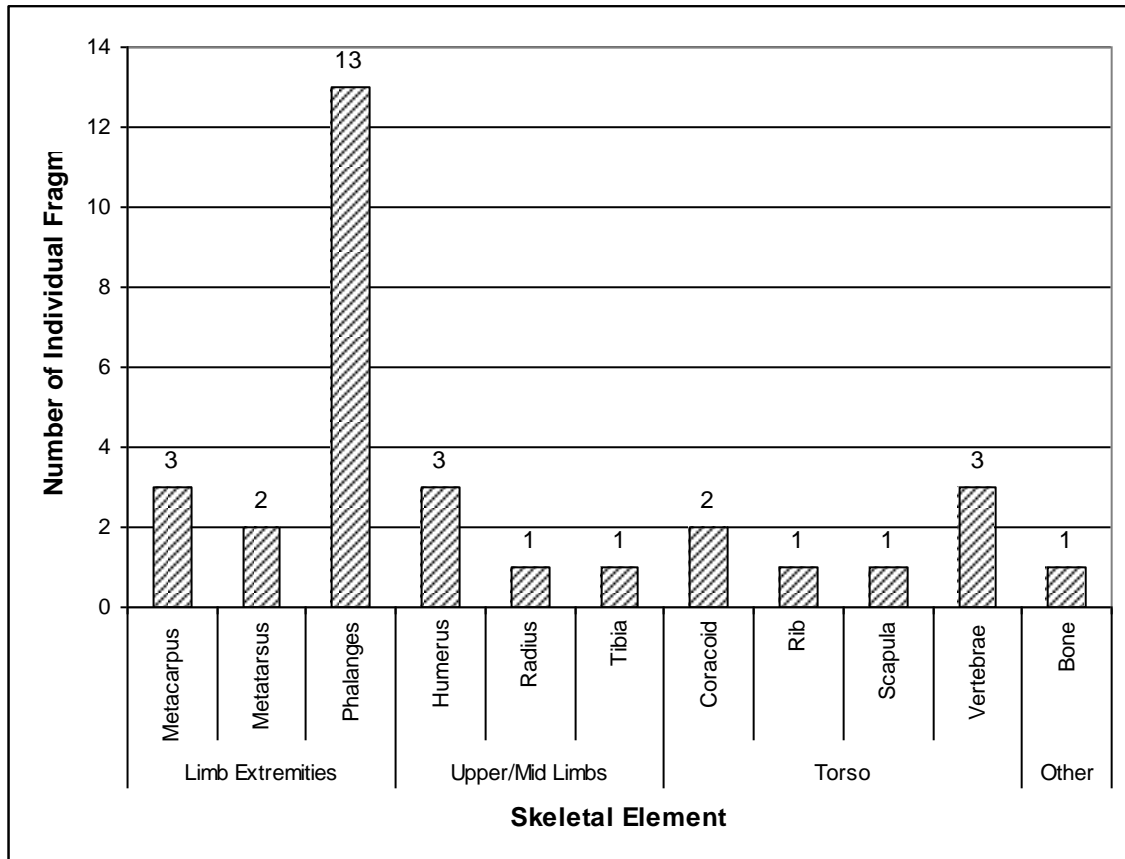


Figure 5.59: Distribution of *Puffinidae* skeletal elements across different meat bearing areas

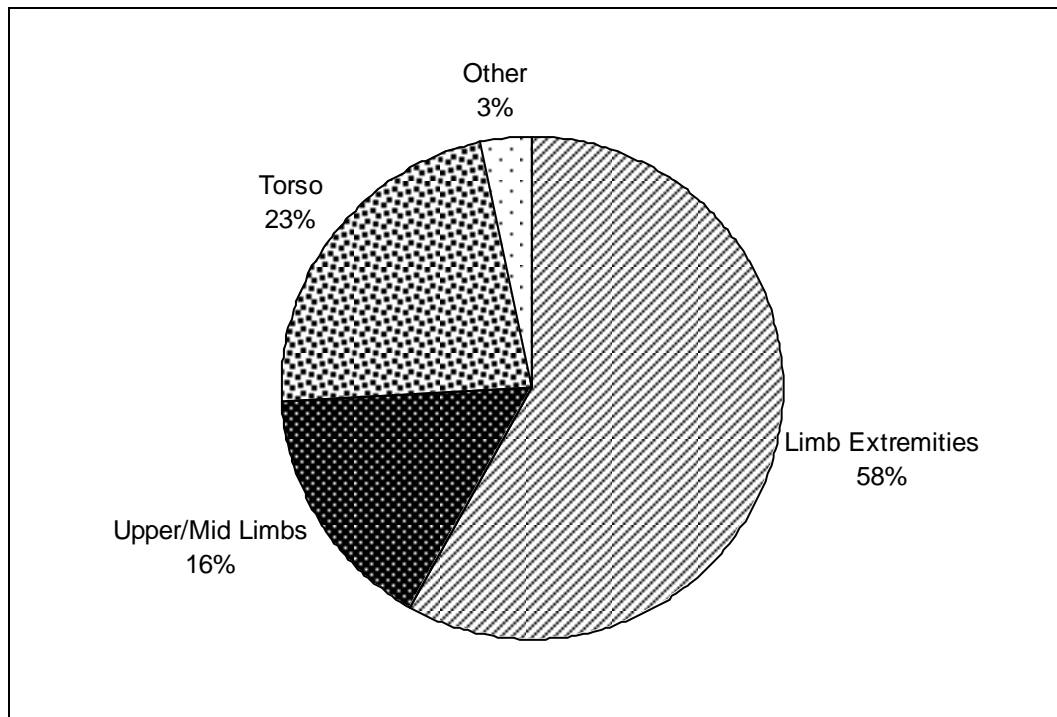


Figure 5.60: Proportion of *Puffinidae* skeletal elements in different meat bearing areas

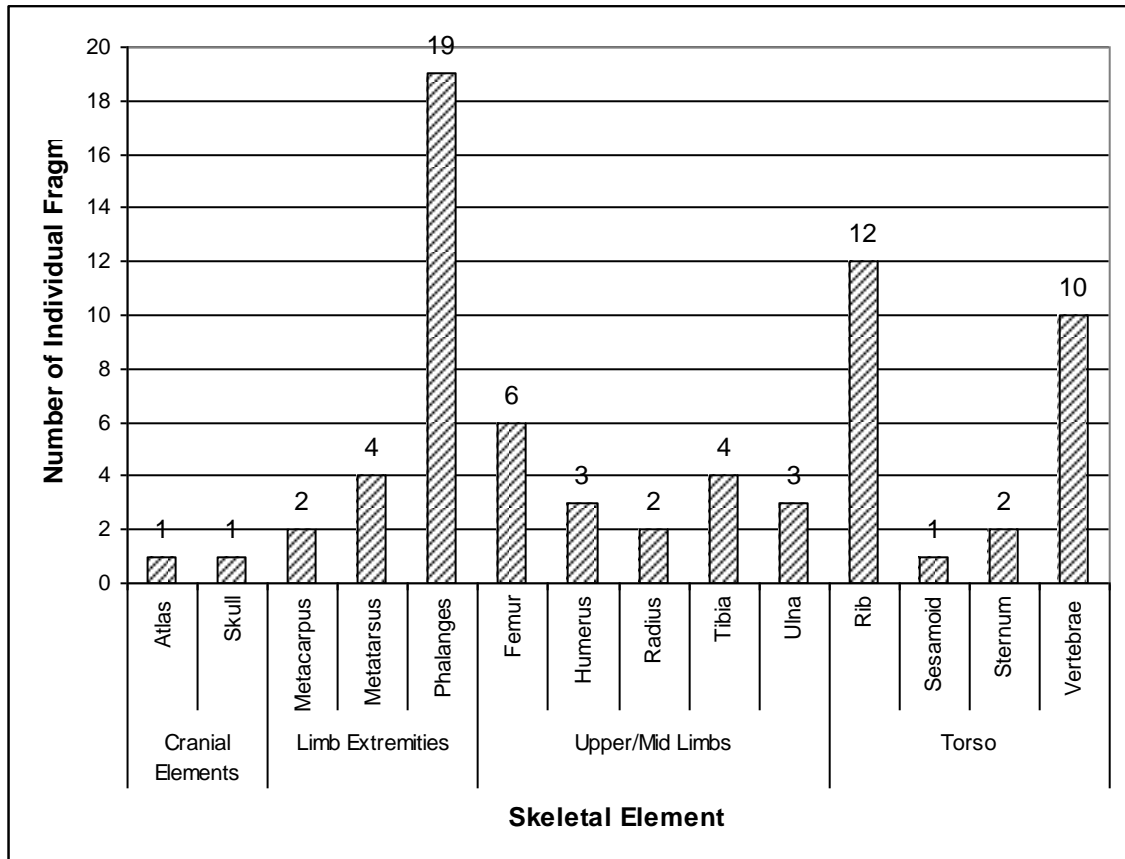


Figure 5.61: Distribution of non-species identified avian skeletal elements across different meat bearing areas

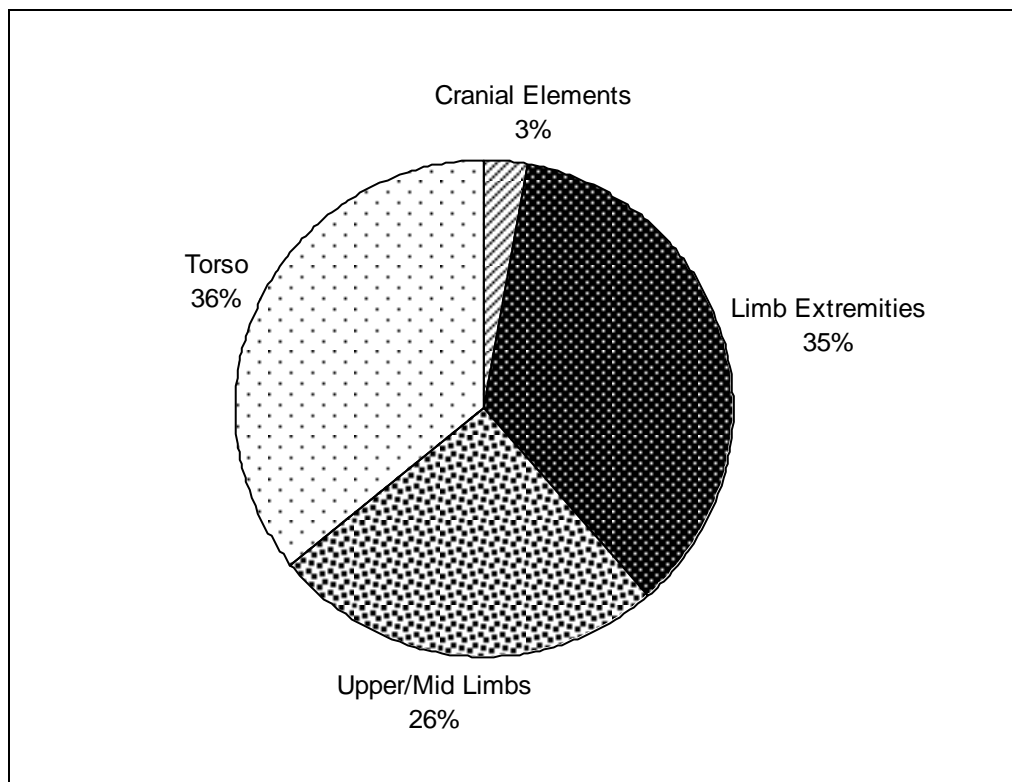


Figure 5.62: Proportion of non-species identified avian skeletal elements in different meat bearing areas

other native birds. The possible presence of domesticated birds may explain the occurrence of cranial remains, as poultry would have been housed adjacent to dwellings and are more likely to have their heads disposed of near the house; as opposed to muttonbirds whose heads may have been removed as a method of killing them at nesting colonies, with the rest of the carcass brought back for preparation and consumption.

Artefact Dating

Much of the PJJ assemblage comprises organic and other fabric, which as discussed previously are generally non-dateable, while glass, metal and ceramic artefacts typically are dateable. A large portion of the PJJ glass, metal and ceramic are too fragmented or corroded and/or of relatively common make and/or pattern to make meaningful dates hard to pinpoint. Nevertheless, 68 items were dateable to a reasonable degree (see Figure 5.63), the majority of which were nails and a small selection of other metal items. Some ceramics and glass was also dateable and the entire range of collection dates span from the 1780s to the present day.

Of the metal items, the majority are nails and include 10 hand wrought nails dating from 1788 to the 1850s, 10 cut nails dating from 1788 to the 1860s, four patent machine cut/wrought nails dating from 1837 to the 1860s, one iron wire nail dating from 1853 to 1893, 17 steel rose-head wire nails dating from about 1850s to the present and 11 steel rose-head wire nails dating from about 1880s to the present (Burke and Smith 2004). Two metal buttons are dated from the 1850s to 1870s (Albert and Kent 1949; Johnson 2005), and two percussion caps from a type of muzzle loading gun, were in wide distribution by the 1830s, with more limited use after the 1850s (Nonte 1973).

The ceramic assemblage from PJJ comprises a mix of generic white glaze earthenware and porcelain from surface scatters which generally date from the late 19th to mid 20th century, and a generic mix of blue and white transfer fragments of varying patterns from excavated deposits which broadly dates from the 19th to the early 20th century. A selection of seven ceramic items were dateable, including pipe fragments, one cup and one plate fragment and two fragments from hollowware vessels. The two pipe stems bearing makers marks were dateable and in fact appear to have come from the same factory: the stem marked 'Murray' was made by William Murray of Glasgow between about 1820 and 1861, while the stem marked 'Davidson' was made by Thomas Davidson between 1862 and

													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
													Continue on to 2000s
Mtl	Nail												Continue on to 2000s

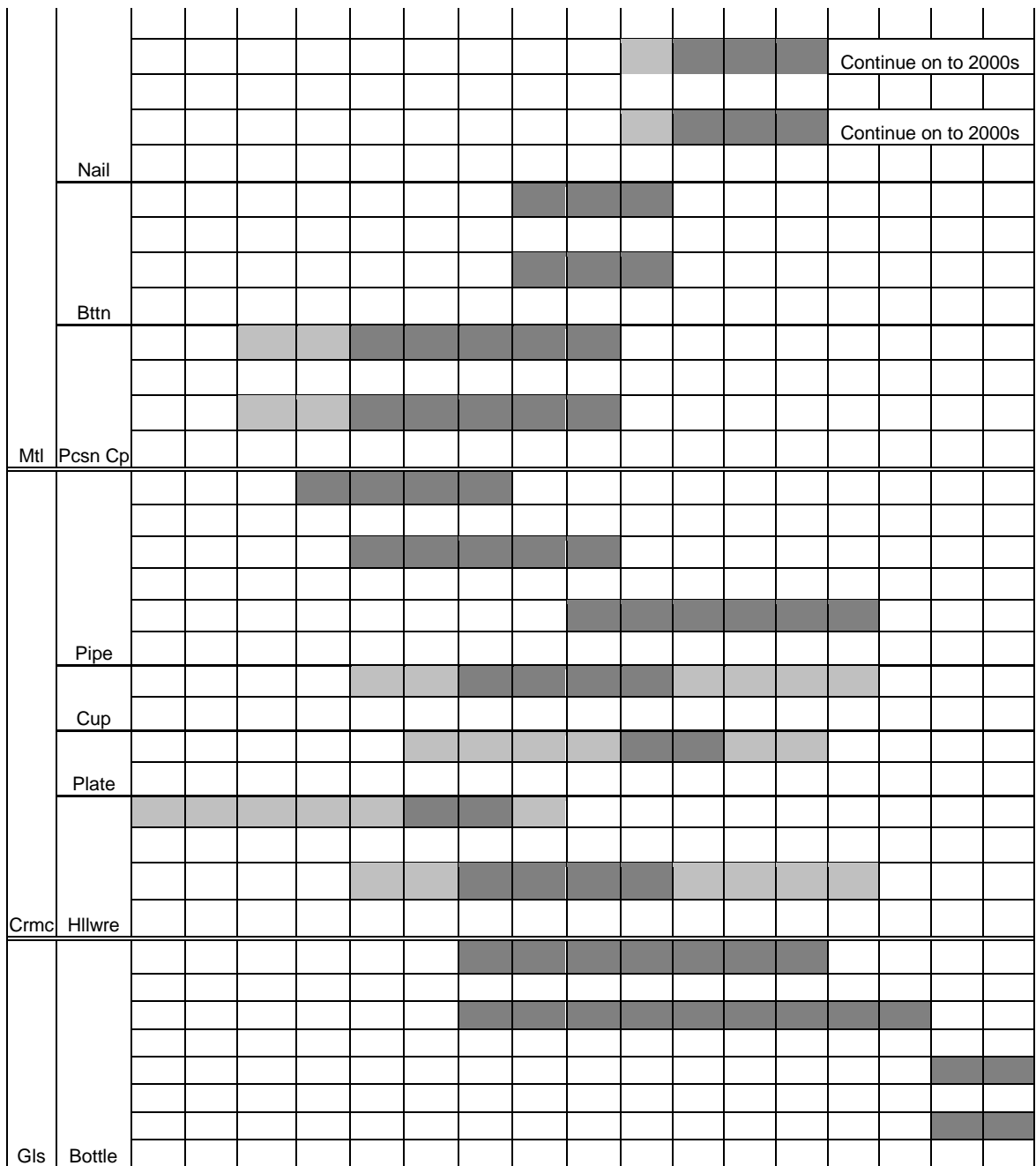


Figure 5.63: Date ranges of 68 artefacts from PJJ.

Note: Dark grey = period of most common use
 Light grey = period available, not in common use

1911, who took over the Murray business upon William’s retirement in 1862 (Gallagher and Price 1987: 110). The cup fragment and one of the hollowware pieces are examples of flow blue, a type of transfer ware which was available 1820 to 1910, but was most popular in Australia from the 1840s to the 1870s (English Flow Blue China: a brief history 2004). The datable plate fragment has an ‘Asiatic Pheasant’ pattern, which was popular from about 1837 to 1901, with the height of production spanning from 1860 to 1914. With the advent

of mass production, the quality of pieces declined, and the original scalloped style edges were replaced with smooth, dating the PJJ example from about the 1870s to 1880s (Asiatic Pheasants 19th Century Staffordshire Blue Transfer Printed Pottery: Pattern History 2006; Coysh and Henrywood 1982). The last datable ceramic piece is a hollowware fragment which has a Mocha style decoration, a form of dipped earthenware available from 1789 to the 1850s and popular in Australia during the 1830s and 1840s. The PJJ example includes an emerald green section of decoration, a colour which was available during later years of production which dates this piece from about 1823 to 1850 (Johnson 2005; Van Rensselaer 1966).

Of the glass artefacts in PJJ, only four bottles from surface collections were datable while excavated glass was too fragmentary and generic to date. Two items were wine bottles, one a cordial bottle and the last a clear, unlabeled bottle which is a likely alcohol bottle due to its size and closure. One of the wine bottles which was marked 'Penfolds' has a ring seal closure dating it from the 1840s up to the 1920s, while the unmarked bottle has a double collar seal which was in use on clear bottles from the 1840s up to at least the 1900s (Boow 1991; Burke and Smith 2004). The second wine bottle is marked 'Seppelts' and the cordial bottle 'Mynor', both of which have a date of 1934 to 1948 as indicated by the style of AGM (The Australian Glass Manufacturing Company) logo on their base (Boow 1991; Burke and Smith 2004).

The total range for the dated PJJ assemblage is over 200 years which is equal to the entire colonisation history of Australia and is obviously problematic concerning LHI sites and PJJ in particular. This is resolved when the dates are further examined: the mean date for PJJ is 1889.64, the median is 1890 and the mode is 1850 (see Figure 5.64), all of which support documentary evidence that the general area was permanently occupied from the 1860s to at least the 1950s.

Other Analyses

Soil samples taken from across the excavated squares show a slightly alkaline matrix from the top layers of soil in all undisturbed squares, with a small increase in alkalinity in the lower spits that penetrate the sandier dune base. Very little differentiation between squares was apparent, with the only fluctuations being observed between stratigraphic features, such as the clay infill, the grey sandy soil, the yellow sand and dune conglomerate. As with OSBF, the general soil matrix appears to be favourable for bone

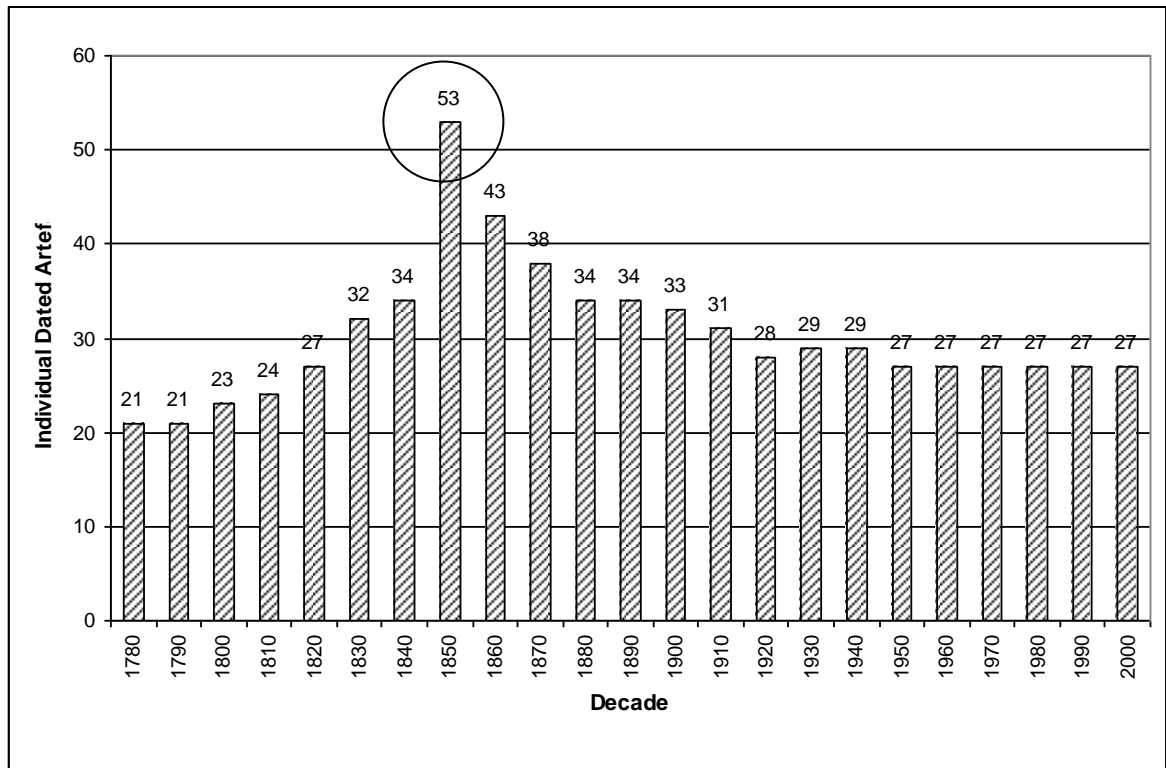


Figure 5.64: Frequency of decades across all dated objects from PJJ, showing the mode at 1850.

preservation, and any unusual patterns in assemblage representations of organic remains are a result of depositional or taphonomic factors, rather than ambient soil conditions.

Discussion

The PJJ assemblage, while fragmentary and partially disturbed, strongly supports the historical record of the PJJ area and the locations of both the Johnson's and Fenton's dwellings. The glass, ceramics, buttons, beads and pipes recovered from this site are consistent with those expected from a 19th century Australian-British household, and appear to include remains from both a dwelling area and a possible auxiliary structure. Historically, PJJ is a mid to later settlement site, and the artefact assemblage and structural indications recovered also support the documentary record regarding daily life, subsistence and trade.

Construction and Occupation

Although lacking definitive building remains, the excavated squares at PJJ appear to have uncovered two distinct deposit types. The first area, marked by the first two

excavated squares appears to be likely underfloor deposit (albeit partly disturbed) from the Johnson’s house, as it includes a broad selection of glass, metal and ceramic items, and the only example of decorative items, beads. In contrast, the assemblage recovered from the small grided area has a significantly more ‘industrial’ influence with a very large share of nails, wire, ammunition and other metal recovered in PJJ. In conjunction with the calcarenite blocks and frequencies of faunal remains and charcoal, the small area delineated by the blocks is suggestive of an underfloor deposit from a detached kitchen/smokehouse and/or shed that had a partial timber floor. This interpretation of the PJJ remains is supported by documentary accounts of typical house/farm arrangements on the island:

“Each house is surrounded by out-houses, the sides of which are sometimes not thatched, and have a very light, tropical appearance. They consist of barns, fowl-houses, houses for goats, pigs, and dogs, and drying floors for onions” (Fitzgerald 1870: 37-38).

Contemporary photographs support the descriptions of clusters of outbuildings and dwellings on LHI, as well as confirm the use of calcarenite blocks as pier supports for timber floored structures and the occurrence of smokehouses among these service buildings (see Figures 5.65 and 5.66). The reference to onion drying floors is an interesting hint as to the possible nature of the suspected floored section of the ‘auxiliary’ building, which may also have been an area used for storing other items off the ground to avoid damage from damp or soil borne vermin. The likely underfloor nature of the deposit excavated at PJJ is further supported by the contrasting composition and smaller degree of fragmentation of artefacts recovered from the three surface scatters. The larger fragment size and higher frequency of ceramic and glass suggests that the deposits eroding out of the slopes which form surface scatters two and three is in fact from a dedicated discard deposit, such as a



Figure 5.65: Late 19th century LHI house with support piers cut from local calcarenite. ND. Courtesy of the Lord Howe Island Museum



Figure 5.66: Example of a 19th century LHI smokehouse attached to a larger building. ND. Courtesy of the Lord Howe Island Museum

rubbish pit or privy; indicating the excavated PJJ material is more likely to be a result of under-floor and/or sweep zone deposition which generally comprises material that is so small it falls through cracks in timber flooring, forming a sealed, slowly accumulating cultural deposit under the floor. The presence of these deposits, the calcarenite blocks and the lack of any compacted soil features suggestive of a dirt floor, combined with the 1882 photographs of the Johnson's house and surrounding buildings firmly support the inferred calcarenite pier and timber joist construction of their palm thatched house and accompanying outbuildings.

The dates of construction, length of occupation and time of demolition of these two structures is unknown from either the documentary or archaeological records, as there are several possible scenarios. Upon the Johnsons arrival it is known that they built the palm thatch house which was photographed 22 years later during the visit of Bowie-Wilson's commission. It is unknown whether this dwelling was the sole residence constructed by the Johnsons during their 60 year occupation of the area, or if a replacement house was built at some point after 1882. The location of the 1882 thatch dwelling is the house which was known by residents and fairly confidently found by the investigations at PJJ. If another residence was built, it is highly likely that it was located either on the exact site of the previous house, or immediately adjacent, and if this was the case it is possible that any deposits associated with these dwellings overlap each other and are completely indistinguishable. Thus, the excavated features uncovered at PJJ which are likely house deposit could potentially be from 20 to 60 years deep, and could potentially include remains from two concurrent dwellings occupied by the same people. The likely history of the additional building is even less known, and again could be a deposit from a long lived structure of approximately 60 years, or a relatively ephemeral building, depending on the exact nature of its use and the quality of its construction. The 1882 photographs (see Figures 5.67 and 5.68) of the Johnson's house do not show any buildings in a suitable location, so it is probable that this particular structure post dates these photographs.

Despite the lack of finer dates relating to building construction, the PJJ assemblage does generally confirm the historically known permanent occupation of the site in 1860. In particular, the presence of mouse and cow help to confirm the post 1860 date of occupation of the site, as mice were introduced some time after 1868 (Etheridge 1889) and cows just prior to 1870 (Hill 1870). The majority of other dated (excavated) items confirm the historical dates of 1860s to the 1910s for the Johnson occupation, while surface scatter

dates generally support the Fenton occupation from about the 1890s to just after WWII. Interestingly, no obvious evidence of the presence of tenants has been found, even though three different groups of people occupied part of the Johnson's land at numerous times. One tenant family, the Searles had 10 children and another couple Edmund Jeune and Celine Moore had two, but no overt sign of a significant increase in people nor the presence of children has been found (New South Wales Legislative Assembly 1890; New South Wales Legislative Assembly 1895; Nichols 2006; Nicholls 1952; Rabone 1940 Stevens 1892-1900).

Subsistence and Trade

Given the long period of occupation of the PJJ dwelling and auxiliary building sites, the possible range of foods are somewhat under-represented, particularly from introduced species. This in part is a likely product of the lack of a dedicated discard deposit, but the generally good representation of other species in PJJ suggests that regardless of this lack, the deposits that were excavated are still a good indication of subsistence at PJJ. Previously identified food sources such a fish, urchin, pig, goat, chicken, muttonbird and a range of shellfish were recovered, in addition to the new species of cow. All of the introduced species present as well as fish and muttonbird are mentioned in documentary sources as accessible resources, but other available species such as duck, goose, turkey and sheep are conspicuously absent, while cow and goat are particularly scarce (Cloete 1869; Corrie 1876; Fitzgerald 1870; TDE 1893). The lack of cow is a likely result of the majority of cattle grazing being dedicated to dairy production and draught animals, and the low starting stock available to islanders. The introduction of cattle to the island in 1868-69 began with a stock of one bull, two steers and four heifers, and the opportunities for islanders to supplement this stock from the mainland would have been restricted; not only by the lack of shipping available but also the settlers limited ability to accumulate cash wealth to purchase more stock on an island running a barter society (Corrie 1876; Hill 1870; Fitzgerald 1870). Natural growth from the starter stock would have allowed most settler families access to dairy and draught animals within a fairly short time given the islands culture of sharing resources and barter, but a sufficient surplus of cattle to allow regular consumption of would have taken much longer to develop; islanders growing up during the 1930s and 40s were still subsisting primarily on poultry, goat and pig (Fenton 2004; Wilson 2004).

The apparent lack of goat consumption is harder to explain, as sources contemporary with the Johnson's occupation indicate feral stocks were as a general rule plentiful, hunting provided great sport as well as food and the consumption of goat was favoured due to its likeness to mutton (Clarson 1882; Fitzgerald 1870; Hill 1869). Sources also mention the goats being kept penned as domestic livestock, in addition to the wild roaming animals, and the stocks of goat were plentiful enough in the 1860s and 1870s that they were a regularly traded item with visiting ships that had a set price of three pence per pound, alive or portioned (Hill 1869: no pagination). Goat skin was also possibly a valued resource as several sources indicate that cured hides served to make footwear and clothing during the 1870s and 1880s shipping slump, when replacement clothing and footwear were very difficult to obtain from the mainland (Edgecombe 1987; Hines 1960). In general it appears the lack of goat at PJJ may merely reflect the lack of a discard deposit, but there is also a possibility that it reflects a combination of the trading of animals off the island and an apparent decline in population during the 1880s and 1890s. While early accounts all indicate goat were numerous up to at least the 1870s, visitors writing 20 years later remarked that there were only a few on the tops of Mt Lidgbird and Mt Gower, and on Goat (Blackburn) Island (Maiden 1898). This decline may be attributed mostly to overexploitation, but another source suggests that inbreeding within three distinct regional populations (the Northern Hills, Mount Lidgbird and Mount Gower) was a contributing factor by 1887 (Finch and Finch 1967).

The occurrence of chicken at PJJ is also arguably less than expected, given the abundance of domestic fowl indicated in numerous sources from the 1860s to at least the 1940s (Anon 1930; Clarson 1882; Cloete 1869; Corrie 1876; Fitzgerald 1870; Hill 1869; TDE 1893; Villiers 1937). Trading of chickens and other poultry with ships during the 1860s and early 1870s combined with the types of deposits represented at PJJ and the potential for more domestic poultry remains to be present in the unidentified avian remains are likely to account the apparently missing fowl. The representation of pig in PJJ generally reflects the expected frequency, and apart from difficulties with MNI and possible differential preservation of different age individuals as discussed in previous sections, the frequency of the pig assemblage generally supports the documentary accounts of pig exploitation on LHI during the Johnson's occupation. The unbalanced representation of cranial elements is interesting, and may be an indication of large pork cuts being shipped off island as discussed previously, however this may also be a reflection of teeth being a

particularly easily deposited item in underfloor collections, as their compact size would allow them to fall between flooring gaps.

Of particular note is the significant presence of fish at PJJ, which is the most numerous faunal group in the assemblage. This frequency reflects the historical indications that fish were an abundant and regularly utilised resource from first settlement onwards, one that was suggested as a possible export for the islanders on several occasions as a means of establishing an additional source of income and trade (Anon 1880; Clarson 1882; Finch and Finch 1967; TDE 1893). The presence of muttonbird and shellfish in reasonable numbers also matches general expectations of marine and shore gathering at PJJ, as indicated by historic accounts and previously established subsistence in the earlier settlement site. Historic accounts indicate that islanders continued harvesting mutton bird chicks and eggs for domestic use and trade throughout the 19th and well into the 20th century, while other seabird species such as the Sooty Tern (*Sterna fuscata*) were harvested for eggs at least until the 1880s and the Providence Petrel (*Pterodroma solandri*) was occasionally taken as an alternative to muttonbird (Clarson 1882; Hutton 1990; Nicholls 1952). Local gathering of seabirds in the PJJ area is likely, but the magnitude of the available resources is not clear. It is likely local shearwater colonies were available in the Soldiers Creek area prior to pasture clearance, but the extent and longevity of such colonies is unknown, as is how much original vegetation remained in the area at the time of the Johnson's occupation. Remnant nesting colonies now exist on small islets at the very southern end of the lagoon beach system, and islanders have been travelling by boat to the nearby Admiralty Islets to gather seabirds since at least the 1880s, providing opportunities to supplement any local PJJ catches that may have diminished with time (Clarson 1882; Hutton 1990).

With regards to shellfish and urchin remains, localised marine gathering from the more exposed Johnson's Beach area may have been less profitable than at other locations on the island, but the much smaller amounts of shell recovered at PJJ may also be an indication of depleted shellfish resources, dietary preference (with the more varied crops and livestock available a more established settlement) or may be, as discussed earlier entirely a product of the PJJ site not having a discrete discard area sampled. The presence of the native land snails is ambiguous, but as discussed previously there is a reasonable chance that the remains recovered are a mix of self introduced and consumed animals. In general the PJJ assemblage, despite its interpretative limitations, reveals a more balanced

subsistence regime, with both marine and terrestrial gathering of native resources equal to the utilisation of introduced species, some of which may show impacts of ship trading.

Site Formation and Preservation

The historical and archaeological evidence strongly indicates that the PJJ excavated assemblage originates from the first permanent domestic occupation on that specific site, with the closest permanent occupation occurring approximately 100m further south at the Wrights farm, which was occupied by the Wrights from about 1842-45 to 1862. The extent of the Wrights farming activity is not exactly known, but evidence from Denham's 1853 map (See Figure 5.59) shows the majority of activity occurring south of Soldiers Creek, with one area marked north of the creek which roughly corresponds with an area located approximately 50m downhill from the PJJ house site. The existence of early artefacts potentially dating from the early 19th century such as percussion caps, bird shot and possibly tobacco pipes may be residues of people such as the Wrights, or crew from reprovisioning ships moving through the area prior to the Johnsons arrival in 1860. Regardless of these potential earlier depositions, the link with the Johnson and later Fenton domestic occupations is clear for the majority of material. As discussed previously, the two underfloor deposits are likely to have accumulated slowly over potentially 60 years of occupation before the abandonment and either demolition or eventual decay of the associated buildings. Following exposure of the underfloor features, the accumulation of further soil to bury the top remains and the eventual growth of a turf is likely to have been relatively slow, and would have been influenced by the presence of livestock and exposure to onshore winds and airborne sand. There was potentially a significant period of time where the exposed deposits were subject to a certain level of trampling from cattle and possibly sheep, goats and pigs moving across the site which may have contributed to the fragmentation of the assemblage as well as compacting deposits and deflating any potential stratigraphy.

Disturbance to the site post burial has been shown by the foreign materials in square one and is a likely result of road, culvert and/or Telstra cable trench construction and/or maintenance. Disturbances to square two and the grided area appear to have been contained to stock trampling prior to burial and perhaps continued compaction from current grazing activity, while other features of the site such as surface scatters two and three have been identified as a direct result of livestock disturbance and water erosion.

In general, the PJJ assemblage and depositional evidence confirms the general picture created by documentary and oral history sources regarding the location, date and nature of the Johnson and Fenton occupations at PJJ. The recovery of archaeological remains that indicate the likely presence and construction of a dwelling and subsidiary structure, has also revealed evidence of subsistence from a balanced range of marine and terrestrial sources, while also signalling the introduction of two new species; one valuable livestock and other common vermin. The non-organic assemblage contains many examples of the type of everyday home wares used by occupants, which in form and quality are generally typical of average working class households in the contemporary Australian colonies, and again reflects the documentary evidence about standards of living on LHI during the mid to late 19th and early 20th century.

Early versus Middle Settlement: constants and changes from OSBF to PJJ

From the documentary and archaeological evidence examined for OSBF and PJJ, several areas of consistency and change become apparent between the two different sites, and by extension between ‘early’ settlement and ‘middle’ settlement as loosely represented by these two examples.

Housing

From both the historical and archaeological record it is obvious that the PJJ site is a part of the more established settlement landscape and community than that at OSBF. The different forms of building construction evident at each site indicate access to different building materials, labour resources and knowledge of the surrounding landscape. The dwelling built at OSBF, while of very sound and practical make, mostly utilised local resources that were immediately obvious from the surrounding landscape, such as basalt rocks and calcarenite blocks from the bay, clay from the local creek and posts, battens and thatching from the palms growing in abundance along the bay foreshore. In contrast, the PJJ structures, while still effectively utilising locally available materials was most likely constructed using wood or calcarenite piers with pit-sawn joists, posts, beams and floor boards. This construction would require more intimate knowledge of local timbers and their locations, saws, pits and sufficient labour for sawing, haulage and construction, in addition to a suitable skill base which included knowledge of carpentry and basic engineering. In general the construction of the PJJ house embodied a larger task which

was a more realistic undertaking for a settlement of over 30 in 1860 than one of seven adults in the 1830s. Apart from differing floor construction, and the likelihood of the PJJ house having a detached kitchen, both dwellings are likely to have been similar in general appearance and comfort with similar palm thatched walls, roof and simple swing out thatched window shutters. The quality of day to day life in each dwelling are likely to have been comparable, as the general day to day survival of the OSBF inhabitants and the Johnsons are not likely to have been dissimilar, and their general work requirements and leisure opportunities would probably closely reflect contemporary working class rural families on the Australian mainland.

Subsistence

The presence of a large hearth suitable for smoking large quantities of meat at OSBF and the likely existence of one at PJJ at some time (whether it is reflected in the assemblage or not) are general markers of how day to day subsistence and the needs of supplying the ship trade changed little between the two phases of settlement. Patterns of practical and preferred domestic food sources and tradable commodities which were likely identified by early settlers, appear to have continued throughout later settlement; both in the selection of introduced species and natively available food resources. The unchanged selection of economic native species present in both sites indicates that local species that were established as food sources by the early settlers continued to be targeted by later occupants, some of which may have begun to show signs of stress from human exploitation. Localised gathering from the southern shore and mountain areas may have been naturally less profitable than that available at Hunter Bay and nearby Ned's Beach, or alternatively the reduced frequencies of molluscs in PJJ site may be an indication of depleted shellfish resources by the time of middle settlement. Dietary preference could also be a factor, given the larger variety of crops and livestock available in the more established settlement. Any conclusions about this particular issue are difficult as PJJ has no discreet discard area like those recorded at OSBF, making comparisons of artefact frequencies very problematic. In general the day to day animal based diet of the early settlers compared to the later islands appears to have been comparable, prior to the introduction of cattle in 1870. The increasing access to dairy, the continued introduction of new fruit and vegetable crops, and the inevitable decrease in native food sources would have slowly shifted the focus of later settlers away from earlier subsistence strategies, but some of the more

sustainable activities such as fishing and muttonbird harvesting have endured well into the 20th century.

Recycling Behaviour

The OSBF site in particular demonstrated several examples of likely recycling behaviour of early settlers, especially with regard to building materials and household items. Bottle reuse, salvage of building materials from other resources and the eventual re-salvage and reuse of these materials in another location are reasonable explanations for usual the patterns of wear and conspicuous presence and absence of items in the site. These indications are also supporting evidence of the early settlement age of the OSBF site, and the general lack of similar phenomena in PJJ serves to strengthen the anecdotal case for OSBF being very early. Although PJJ has definite examples of available resources being used to their best advantage, such as calcarenite blocks and local palm in house construction, few overt examples of re-cycling are present. One exception is the cemented tobacco tin house pier remaining from the Fenton occupation, an innovation that certainly suggests the need to ‘make-do’, but one that also reflects the greater availability of manufactured materials such as packaged tobacco and building cement after the beginning of regular shipping in 1893 (Nicholls 1952). Interestingly, the extended age ranges of many of the PJJ artefacts may reflect a ‘conservative’ behaviour; there is a great possibility that the early beginning dates of many artefacts are due to these items being used and cared for over an extended period of time, prompted in part by the difficulty in replacing household items and perhaps in part by an ethos of ‘waste not, want not’ which would result in a greater use life of some items than usually expected. No doubt the need and inclination to reuse certain items would have continued during the middle settlement years and the lack of evidence in PJJ may again be a result of the absence of a discard area. Nevertheless, the possibility of feverish reuse during early settlement being slowly replaced by careful conservation should not be overlooked, and is a balance that is likely to have changed with the fluctuating fortunes of individuals and LHI in general.

Chapter Six

From Birth to Maturation: Settlement and Resource Maps

The development of map snapshots of LHI is intended to provide a visual aid in understanding the spatial development of the settlement landscape on LHI and to enable a general assessment of the likely range of environmental exploitation and its ultimate exhaustion. Each map provides a snapshot of the locations of households and populations as at December of each selected year, which were chosen on the basis of major changes in settlement population rather than an arbitrarily selected time block. The locations of gardens and dwellings are identified as closely as possible to that indicated by maps, primary and secondary documentary sources, modern community knowledge and occupations by family descendants, and archaeological evidence. For some settler groups it is possible to pinpoint almost exactly the location of occupation, the likely amount of residents and the possible size and extent of agricultural activities, and these are reflected by large irregular areas marked as gardens and colour coded dwellings. However, the majority of groups are known only from a few accounts of their presence and assumed location, with little information about the nature or size of any subsistence or trade activities they may have undertaken. Where this occurs, dwellings and gardens are located in the best approximation of where they might have been situated and are appropriately colour coded. Most groups, even when sources do not indicate any farming activity, have been shown with some gardening activity, as it would have been necessary for most settlers to undertake at least some subsistence gardening in order to survive on the island, particularly during early and middle settlement throughout the 19th century.

The necessity of farming, particularly during early settlement, also influences the likelihood of gardens being maintained by secondary parties after the original owners had left, and there are several instances where gardens that have been abandoned by the original occupants are likely to have persisted. These are shown as possibilities, signified by question marks. Whether or not these gardens were maintained by secondary parties does not alter the reality of these areas being cleared patches in the native forest regime, and even if completely abandoned, would have been altered landscape features until sufficient time had passed for them to be reclaimed by native vegetation. Similarly, there are instances of groups arriving, building dwellings and establishing gardens, then

subsequently leaving. Unfortunately only some of these areas of settlement, abandonment and reoccupation are well documented. As with the gardens, the likelihood of perfectly serviceable empty dwellings being completely ignored by new arrivals is low and there are buildings whose existence is known but their occupation status is not, and these are also signified by question marks.

The number of occupants is also an issue that is not easily resolved, as even well documented families rarely have exact information about the births and/or deaths of children, or the resettlement of grown children to other parts of the island or elsewhere. Other less documented settlers may only be known as a name, a couple, or family, implying children but not how many. Also, there are several instances of settler groups having long term ‘guests’, ‘tenants’ or ‘work men’, and the exact time of occupation of these people are usually very ambiguous. As such, many settler groups will have a range of possible occupants, which are signified by a population range and question marks in addition to unique symbols which represent each settler name to distinguish who is actually meant to be occupying the area at any one time. As groups leave these symbols may be reused for subsequent groups, but on each map, each separate group has a unique signifier.

In addition to areas of human activity and occupation being marked, likely marine resource use is also indicated on each map. Specific information about gathering areas are not available from any documentary sources, however reasonable estimations of areas of regular exploitation can be developed in reference to their proximity to settled areas and the human population at each. Combined with the types of habitats available in each location and historic and archaeological evidence of preferred marine resources, likely areas of regular use have been identified and marked accordingly. This mapping refers to areas of shore gathering and fishing only, as access to boats from early settlement onwards allowed islanders to fish deeper water areas for both reef and pelagic species, while also providing transport to preferred gathering areas. On an island the size of LHI, realistically there are few areas of easy to moderate access that would be considered ‘too far away’ to regularly visit if a reliable source of food were available, so in many respects it is reasonable to expect that most shore gathering areas bordering the flatlands between the northern hills and southern mountains would have been part of marine and terrestrial gathering from early settlement onwards. While acknowledging this, the marine resource mapping reflects the likely areas of daily and opportunistic gathering while en route to other areas of activity such as travelling between dwellings and auxiliary gardens and/or water sources.

Water sources are also included on the settlement landscape maps, as they are a significant feature which not only impact on where people situate their settlements, but also act as focal points of activity and influence the creation of routes and tracks across the landscape. The locations of permanent and ephemeral water sources (which include swamp/wetland features) in addition to known wells are based on documentary evidence, modern day drainage and community use, as well as community knowledge of historic use and changes. Other native resources such as birds are much harder to reconstruct on a year to year basis, as the exact rates of attrition of native species is hard to pinpoint, as is the remaining range of each species on such a fine detailed scale. It is possible to generally reconstruct the nature of habitats and by extension general range of birds on the island prior to human contact, which is shown at the beginning of this chapter to illustrate the likely land and sea bird resources available to islanders upon settlement. Where available, records of the decline and/or extinction of certain species will be noted, while others can really only be measured by contrasting the pre 1788 map to the pre 1980 map at the end of the chapter, which illustrates the general range of species late in the 20th century. Unfortunately neither map represents population densities, as this information is not available for most of LHI settlement; rather they serve to illustrate the potential species available in each area based on the availability of habitat and known species range. Historic accounts from First Fleet visitors and later colonial ships, documentary sources from first settlement onwards, bird fossil evidence and modern day species reports provide a reasonable picture of what general changes occurred in the LHI bird populations throughout human settlement.

Pre 1788 Bird Distribution

Information regarding pre-contact and pre-colonisation bird life comes from two sources; fossil bird remains and primary accounts of First Fleet and other visitors to the island prior to 1834. Ornithological surveys conducted during the 1970s for the LHI Environmental Survey included the search and discovery of fossil bird remains around the island, which provided important information about previous distributions of existing birds on the island and the existence of previously unknown extinct species (Hutton 1990). The remains of a small species of penguin similar to the Little Penguin (*Eudyptula minor*) were recovered, and it is thought to be a possible nesting species during the last glacial maximum. Bones from an extinct species of pigmy gadfly petrel were also recovered,

along with the remains of a giant Booby, the Tasman Booby (*Sula tasmani*: Hutton 1990; van Tets, Meredith, Fullager and Davidson 1988). Fossil remains of several existing seabird species revealed three that now only breed on the offshore islets of the LHI group, and another that has never been recorded on LHI, once nested at selected areas around the island. Two of these species in particular, the Little Shearwater (*Puffinus assimilis*) and the White-faced Storm-Petrel (*Pelagodroma marina*), used to breed in large colonies on the lowland sand dunes of the island, along with colonies of Flesh-footed Shearwaters (*Puffinus carneipes*) which were significantly larger than existing groups today (Hutton 1990). The Providence Petrel (*Pterodroma solandri*), which is now restricted to the southern mountains, also used to nest in the northern hills. Fossil evidence for many species are well supplemented by historical accounts, with land birds being the main group described by early visitors to the island.

The accounts of First Fleet visitors provide several important types of information regarding the birdlife on LHI; they are the only descriptions of the Tasman Booby and the White Gallinule (*Notornis alba*), they detail the remarkable abundance and tameness of many species, and clearly indicate which birds were not only easy to catch but very palatable:

“Great numbers of gannets, very large and fat, were walking with less fear and concern than geese in a farm yard; and they were taken by hand, with much more ease. We found their nests in the long grass at the head of the beach, in each of which there were a great number of eggs, very large, and well tasted when dressed [Tasman Booby]”(Gilbert n.d:10).

“Among the different kinds of birds we met with, there was one about the size of a large barn-door fowl, quite white, with long yellow legs, and a remarkably strong red beak [White Gallinule]. I caught six of them, by running them down among the low bushes. The cocks were very beautiful, their white feathers being tinged with azure blue”(Gilbert n.d:11-12).

“On entering the woods I was surprised to see large fat pigeons, of the same plumage and make as those in Europe, sitting on low bushes, and so insensible to fear, as to be knocked down with little trouble [White-throated Pigeon]. Partridges likewise, in great plenty, ran along the ground, very fat, and exceedingly well tasted. Several of those I knocked down, and their legs being broken, I placed them near me as I sat under a tree. The pain they suffered caused them to make a doleful cry, which brought five or six dozen of the same kind to them, and by that means I was able to take nearly the whole of them [Woodhen]”(Gilbert n.d.:10-11).

This handful of accounts all highlight the tameness of several favoured species of land and sea bird upon first human contact with LHI, and if the ease of hunting and

amounts of birds taken were a continual norm for visitors after 1788, it is likely that most species would not be able to sustain such heavy exploitation, regardless of how abundant the starting populations might have been:

“...they brought off a quantity of fine birds, sufficient to serve the ship’s crew three days; many of them were very fat, somewhat resembling a Guinea hen, and proved excellent food”(Marshall 1788 in Rabone 1940:15).

“The fish bit so very fast that in about 2 or 3 hours we had caught some hundred weight - & the pinnance was half loaded....the bait made use of was a piece of the flesh of the boobies of which we had some hundreds also (alive & dead) in the pinnance”(Bowes 1788:84).

By the time of permanent settlement, there is a good chance that the Tasman Booby and White Gallinule populations were either severely compromised or possibly extinct, as no further accounts of either the gallinule or large booby are known. Other species that appear to have been targeted by early visitors include the White-throated Pigeon and LHI Woodhen and are likely to have been on the decline at settlement; the last record of the Pigeon was made by J.D. Macdonald in 1853, who stated that it was only occasionally seen, while numbers of the Woodhen in the low and mid land areas were limited at the same time (MacDonald 1853). The Woodhen’s continued disappearance was recorded by successive visiting naturalists during the mid to late 19th century, until the southern mountain summits were the only refuge of a small and vulnerable population which managed to persist until a successful breeding program in the 1980s. These early extinctions and declines during the first 20 years of settlement make it likely that the bird resources available to the first settlers would have already been somewhat reduced by visiting vessels from those identified at contact in 1788.

The bird distribution map which is dated pre 1788 shows the likely Tasman Booby and White Gallinule ranges, and if they were present at settlement, they would have been easily accessible and caught prey. The booby is described as nesting in large groups along the sandy foreshore of the island, and as such colonies could have been available along the length of lagoon beach, in addition to Hunter Bay, Ned’s Beach, North Bay and Blinkenthorpe Beach. The gallinule would have been at least semi-associated with wetland and/or creek areas, as related birds are in general fresh water feeders. Consequently, the gallinule is likely to have frequented areas near the ephemeral swamps in North Bay and

behind Blinkenthorpe Beach, the creek areas in Hunter Bay and the Soldier’s Creek catchment in addition to normal forest foraging between these areas. The woodhen and pigeon would have ranged across most of the lowland areas as well as the mountain foothills, while various seabirds would have been available from all types of coastal terrain, as well as hill and mountain summits. Land birds would have been available to foragers throughout the year, but sea bird availability is more seasonal and access to either birds or chicks is governed by the particular species and their cycle of feeding and breeding. Some species are present on the island year round, while others only come to the LHI group to breed at regular times of year (see Figure 6.1). The variety of seabirds that nest on LHI and their relatively staggered breeding cycles mean that some form of seabirds and their eggs and/or chicks would be available for gathering year-round, and coupled with the large areas of accessible nesting areas (see Figure 6.2), sea and land birds would have been a valuable and reliable food source for early settlers.

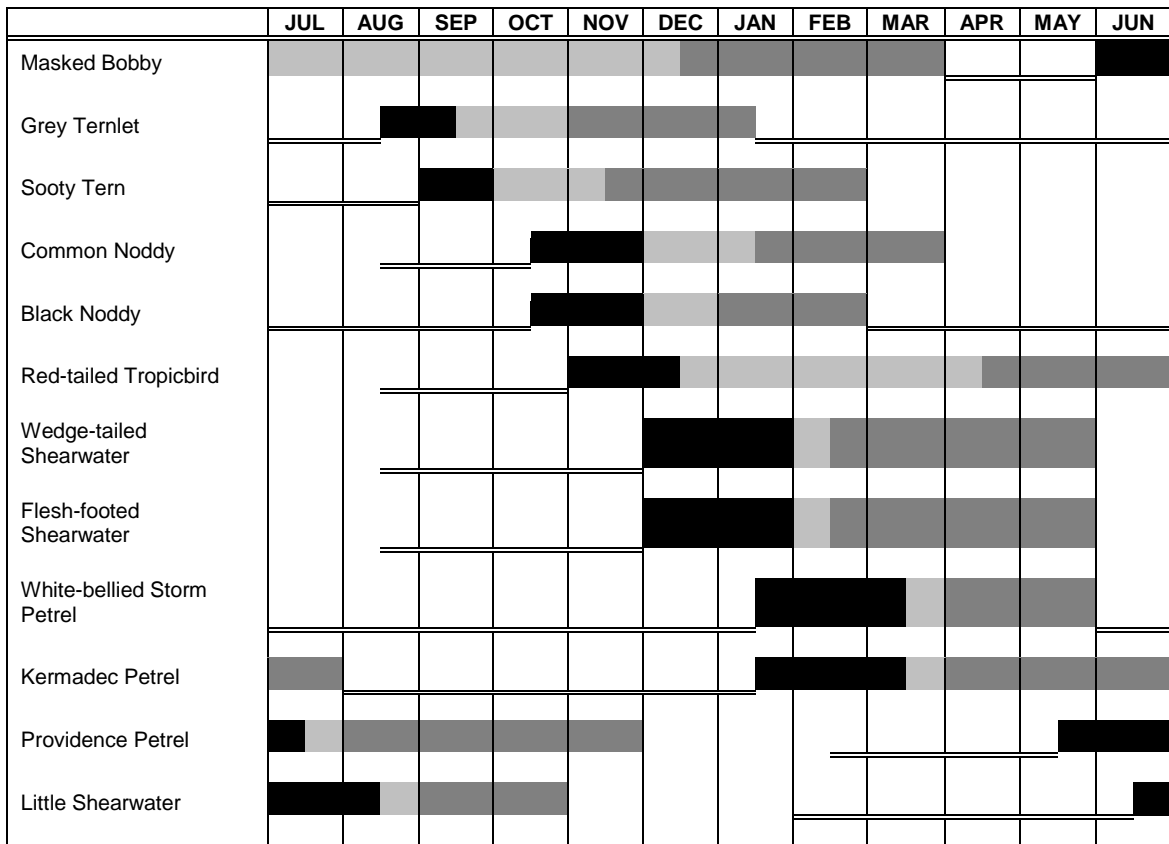


Figure 6.1: After Hutton 1990. Seasonal availability of seabirds nesting on LHI pre 1788 up to the present. Note: Black = eggs Light Grey = Eggs and Chicks Dark Grey = Chicks Double Line = Adult birds present

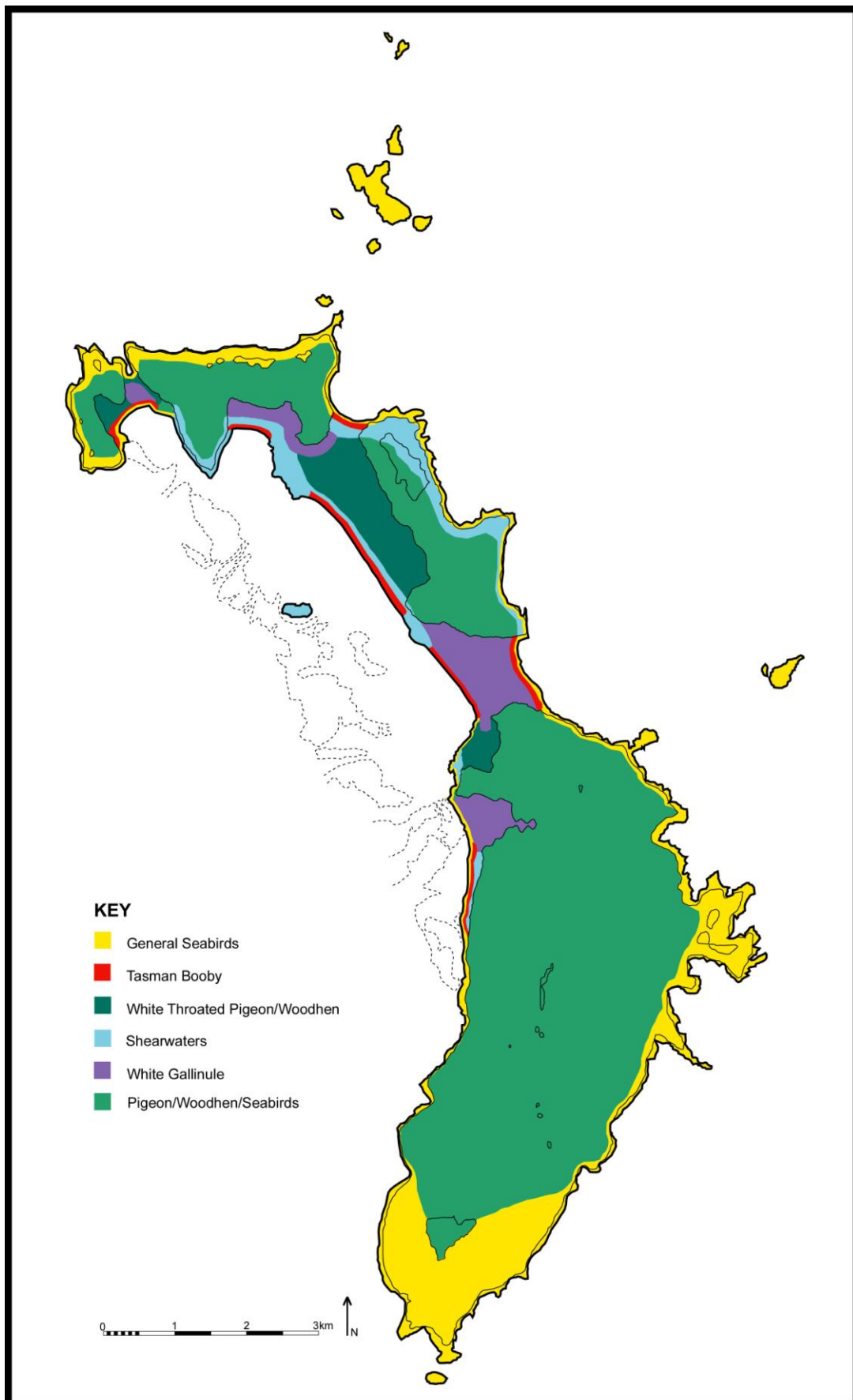


Figure 6.2: Pre 1788 map showing the likely distribution of significant prey species of land and sea birds

First Settlement: 1834

Following their arrival on LHI in June 1834, the Ashdown, Bishop and Chapman (ABC) families established their domestic occupation in the Hunter Bay, and at least one garden behind the Blinkenthorpe Beach dune within six months of their arrival (see Figures 6.3 and 6.4). Historic and likely archaeological data indicate that ABC were utilising a range of native foods, including pipi, black nerite, cockle, sea urchins, fish and shearwaters as well as a potential selection of unidentified native birds. The settlers were likely to have moved across broad areas of the island during their activities relating to the establishment of their settlement and providing ship supplies, but it is probable that selected areas emerged as regular spots for food collection local to their home and work (the gardens).

Hunter Bay is likely to have been selected for first settlement for a number of reasons, including the presence of permanent water, it is more sheltered bay within the lagoon which also would have been fairly rich in shore gathering opportunities. Pipsis and cockles would have been found burrowing in the mud flats of the bay, nerites clustered among the boulders lining the western and eastern shore and urchins available from the reef flats at low tide or within a shallow dive off the shore. Fishing is favourable all over the island, and similar shellfish and urchin resources would have been available at nearby Ned’s Beach to the north-east of Hunter Bay. Some shore gathering would have been available at the lower end of Lagoon Beach and Blinkenthorpe Beach, but the exposed nature of Blinkenthorpe would have limited collecting.

Land and sea birds would have been particularly plentiful in Hunter Bay and en route to Ned’s and Blinkenthorpe Beach; boobies and a variety of smaller seabirds would have lined the sandy shores, with shearwaters nesting in the palm forest floors and rocky headlands of Hunter Bay, Signal Point and Windy Point. Woodhen, pigeon and gallinule all would have been available in Hunter Bay as well as in the vicinity of Ned’s Beach and Blinkenthorpe Beach. The areas regularly visited may well have shifted with the establishment of new gardens elsewhere on the island, but the existence and locations of such gardens is not known, and it is reasonable to expect that ABC would have continued to maintain their Blinkenthorpe Beach garden throughout their occupation.

Year/Map Symbol	Settler Group	Population
1834 !	Ashdown/Bishop/Chapman	9+
Total		9+

Figure 6.3: Table of settlers on LHI and likely population as at December 1834

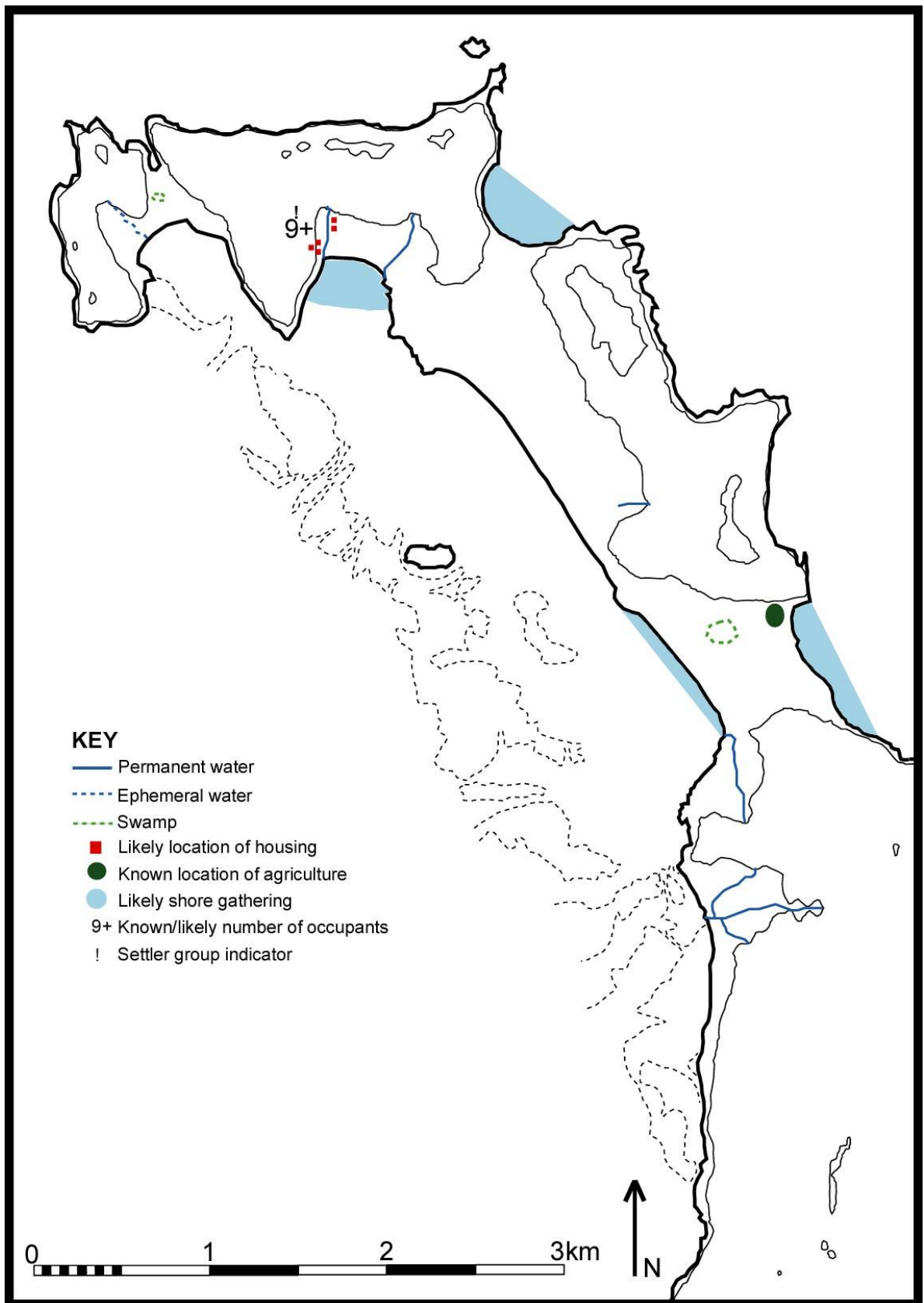


Figure 6.4: Map of settlement dwellings and gardens on LHI as at December 1834

Second Wave Settlement: 1841

The year of 1841 saw a big shift in the nature of LHI settlement, with the a small, family based ship provisioning business being bought out and transformed into a multi-investor enterprise which employed at least seven, and possibly up to ten people (see Figure 6.5). The Poole-Dawson enterprise brought in at least five new people, while other independent settlers made their own way to the island and settled in unoccupied areas in North Bay and along the main lagoon foreshore (see Figure 6.6). The Bishops of the initial group probably stayed on with the new settlers for a few years and probably continued labouring for the provisioning business, while the independent settlers, the Middletons and Charles Williams possibly also found employment with the Poole-Dawson group.

For the most part this new wave of settlement remained concentrated on the northern end of the island, with the majority of people probably remaining in Hunter Bay and the vacated ABC holdings. Expansion of these holdings, at least with regards to gardens would have been likely, as well as the maintenance of any established gardens, such as the 1834 garden at Blinkenthorpe Beach. Gathering of native sources in Hunter Bay and the immediate area probably continued much as before, while the Middleton occupation in North Bay would have prompted use of the booby, shearwater and seabird colonies of that area, as well as gathering of shellfish around the rocky shore and mudflats of the bay and possible gallinule from the ephemeral swamp area. It is possible that upon arrival the Wright family established themselves in the Big Creek basin, where they were farming from at least 1845, and if they did occupy that area, land and shore gathering at the southern end of the island would have intensified from this time onward. Coastal colonies of boobies, shearwaters and other seabirds would have been available, along with fishing and some limited shellfish. The Big Creek basin would have also been a prime habitat for gallinule, as well as woodhen, pigeon and other land birds, with fresh water eels also present in the permanent tributaries of Big Creek.

Year/Map Symbol	Settler Group	Population
1841		
!	Poole/McAuliffe/Hescott/Bishop	6+
@	Middleton	2
#	C. Williams	1
\$	Wright	2
Total		11+

Figure 6.5: Table of settlers on LHI and likely population as at December 1841

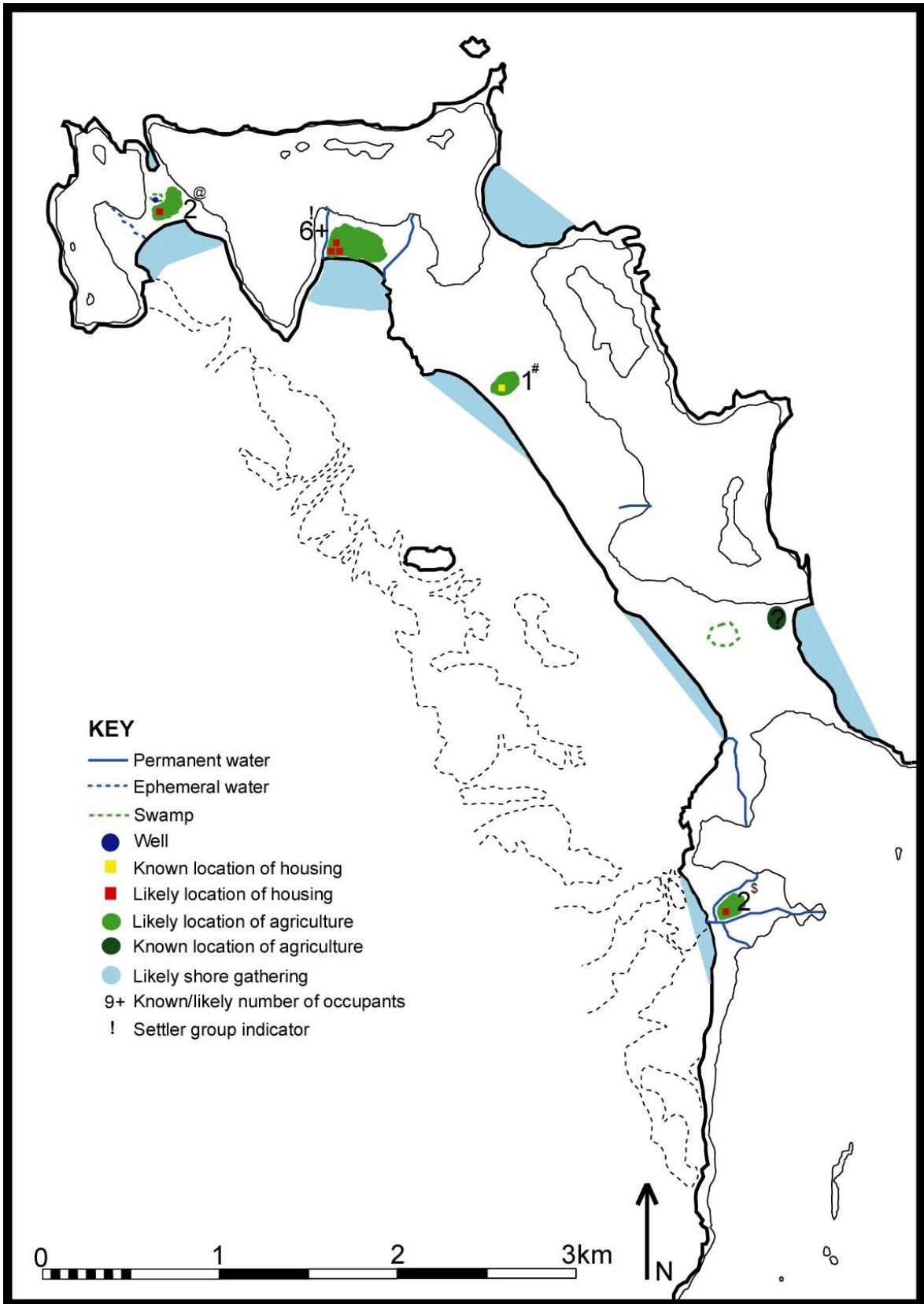


Figure 6.6: Map of settlement dwellings and gardens on LHI as at December 1841

Enterprise Expansion: 1844

After three years, the Poole-Dawson enterprise saw an expansion with a third party, John Foulis, investing in the trade. The subsequent arrival on LHI of at least six new employees, Foulis and his family expanded the island population (see Figure 6.5), and prompted the settlement of new areas. Some of the previous employees of the provisioning partnership had left by this time, but their absence was filled by the arrival of another couple, the Moseley's who were employed by Poole-Dawson-Foulis, and appear to have joined the Wrights at the Big Creek settlement. The Foulis family established a new residence and gardens near Windy Point, with at least two servants, the Andrews, and potentially up to seven working to establish gardens at Windy Point. Alternatively, some or all of the new employees may have continued to work established gardens in Hunter Bay, Big Creek, or possibly Blinkenthorpe Beach, or they may have established new gardens between Blinkenthorpe Beach and Big Creek (see Figure 6.6). The Middletons and Charles Williams both continued where they had established themselves at North Bay and lagoon side, and may have been independent or in the employ of Poole-Dawson-Foulis.

This time saw an even spread of small groups living dotted along the western coast of LHI, and it is likely that traffic between them prompted marine gathering along most of the lagoon shore, and harvesting of the boobies, shearwaters and seabirds that also occurred along this strip of coast. Gathering at Ned's Beach is likely to have continued, with the possibility that the more inaccessible but equally rich Middle Beach became more regularly visited with the establishment of the Foulis household at Windy Point. The expansion of the trade business is a probable indication of the frequency of shipping to the island, and it is likely that the increased demands of ship provisioning influenced the volume of exploitation of native foods. The increased island population and possible channelling of introduced animal products towards the ship business are likely to have started having an appreciable impact on island resources, if not before.

Year/Map Symbol	Settler Group	Population
1844		
!	Poole/McAuliffe/Hescott	3+
@	Middleton	2
#	C. Williams	1
\$	Wright/Moseley	6
%	Foulis/Andrews/Platter?/Varney?/Slade?/Thom?/Cruze?	6+
^	Platter?/Varney?/Slade?/Thom?	1-4+
Total		22+

Figure 6.7: Table of settlers on LHI and likely population as at December 1844

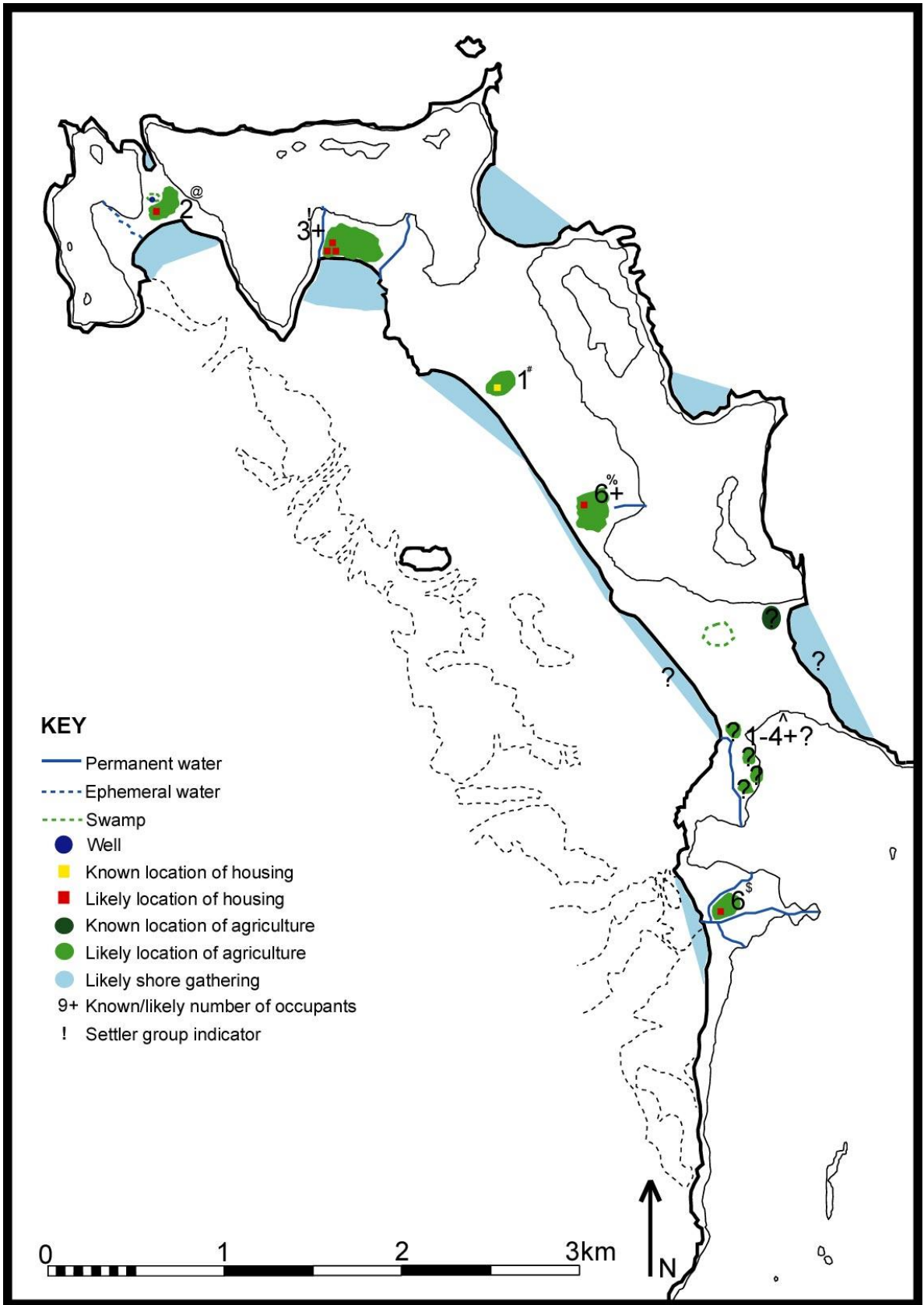


Figure 6.8: Map of settlement dwellings and gardens on LHI as at December 1844

New Partnerships: 1847

Following the establishment of Wright-Moseley-Andrews farming partnership at Big Creek, the balance of the island population started to shift towards the southern end, and once the Poole-Dawson-Foulis partnership folded and Poole, Foulis and their other employees left the island (see Figure 6.9), the vast majority of people were residing at Big Creek (see Figure 6.10). The Middletons and Williams continued where they were at the northern end and middle of the island, and it is possible that they maintained gardens established at Hunter Bay and possibly Windy Point. The Foulis family exchanged their holdings at Windy Point with Capt Pierce of the *General Pike* in 1847, but whether the absent captain installed caretakers at the property or engaged some of the existing islanders to look after the house and gardens is not known.

The continued existence of the Blinkenthorpe garden established by ABC is not known, but it is possible that it and the potential gardens established further south at the unnamed creek were maintained or at least partly tended by the remaining settlers, particularly if the ship trade was significant enough to demand supplies requiring additional land. It is equally possible that these areas were allowed to lie fallow and regenerate for some time previous, with subsequent occupations utilising the partially cleared areas for new plantings rather than clearing completely virgin forest. Similarly, the continued existence of the dwellings at Hunter Bay is not known, but it is possible that they remained for a period before either being demolished for building materials or left to decay.

With the contraction of the population to the northern and southern areas of the island, foraging in the middle areas may have reduced for a time. Likely established larders such as Hunter Bay, Ned’s Beach and possibly Middle Beach may have continued to be regularly visited, particularly by Williams and possibly the Middletons. The influx of people in the Big Creek area would have prompted regular foraging along the southern lagoon beach, down to the southern extreme of the reef, which would have afforded good supplies of shellfish and urchins, as well as access to seabird colonies and shore fishing.

Year/Map Symbol	Settler Group	Population
1847		
@	Middleton	2
#	C. Williams	1
\$	Wright/Moseley/Andrews/Cruze?	9+
%	Prob not occupied - owned by Capt Pierce	0
Total		12+

Figure 6.9: Table of settlers on LHI and likely population as at December 1847

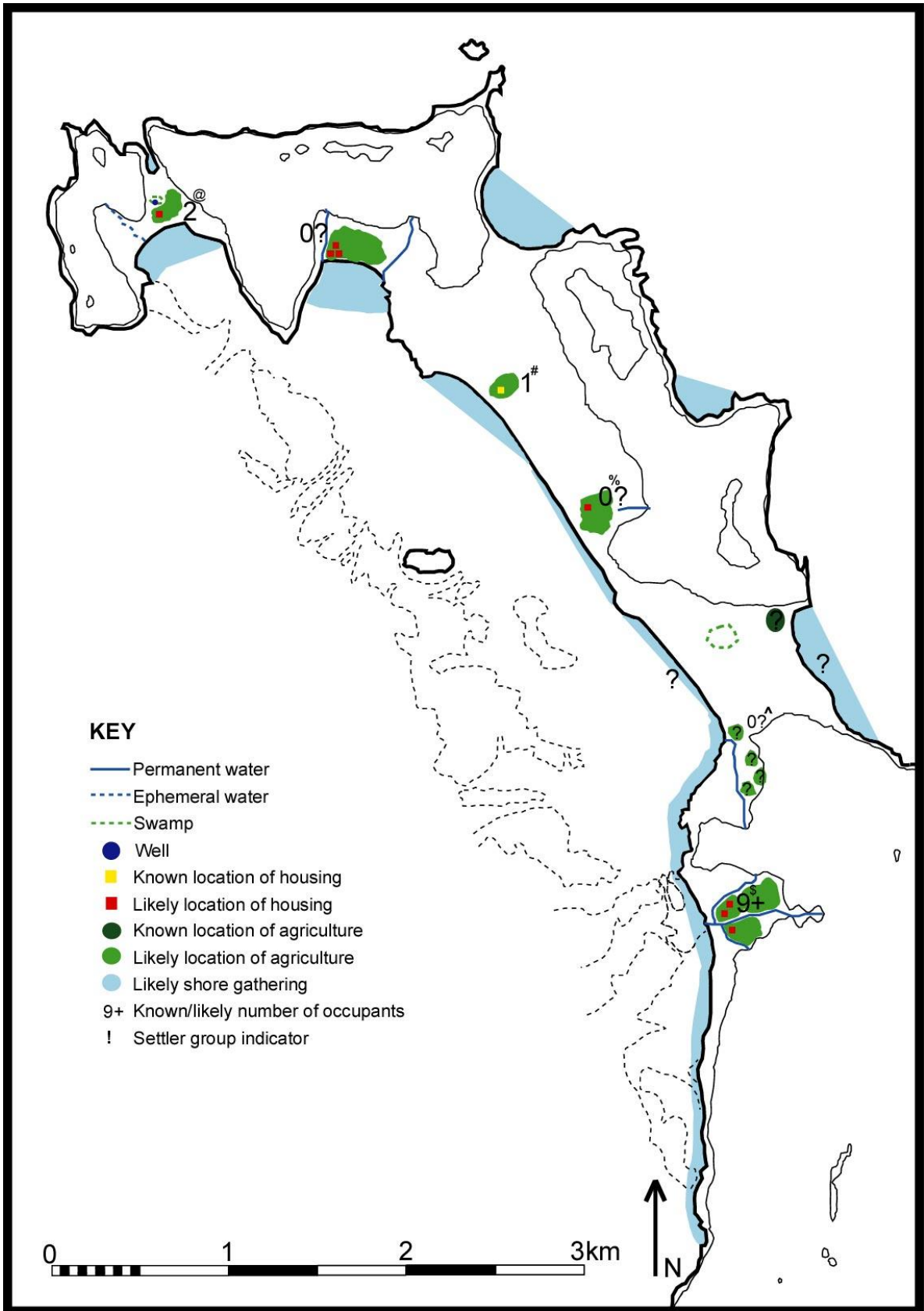


Figure 6.10: Map of settlement dwellings and gardens on LHI as at December 1847

Independent Enterprise: 1848

Within a year of the major settlement shift to the south of the island, the population became more evenly spread across the island again. The Big Creek farming partnership endured until Captain Pierce of the *General Pike* returned and traded the Foulis property at Windy Point with the Andrews, who then dissolved their partnership at Big Creek and moved to their new residence further north (see Figures 6.11 and 6.12). The state of the old Foulis plantings is not known but are likely to have been in fairly good condition, as no more than a year had passed since permanent occupants were working the gardens, and are likely to have been maintained at some level during Captain Pierce's absence. At the same time the Moseleys also chose to move north, and established new buildings and gardens adjacent to the old ABC garden. Whether the garden was still being maintained at this time or if it were partly reclaimed, it is likely that the Moseleys incorporated the old garden site into their new plantings, taking advantage of any cleared land and remnant crop vegetation.

This development saw the beginning of all LHI settlers being independent farmers and traders, and while the ship trade is likely to have been shared among the islanders on fairly equal co-operative basis, shore gathering, fishing and hunting activities at this time were probably largely an independent household activity for the first time. Although the population remained stable, this likely shift in native subsistence strategies probably meant a slight increase in the amount of birds, animals and fish taken at any one time, as the three newly separate households would have been laying in independent larders of preserved products. This surplus product would have not only been for domestic use, but also trade items for incoming vessels and barter with other islanders for domestic produce, native foods, other supplies and labour. Previously established areas of foraging and hunting would have continued to be utilised, although whether supplies of marine foods such as shellfish were available at the same level as during early settlement is not clear, as the initial abundance and sustainability of gathering 14 years after settlement is unknown.

Year/Map Symbol	Settler Group	Population
1848		
@	Middleton	2
#	C. Williams	1
\$	Wright	4
%	Andrews/Cruze?	3-4?
&	Moseley	2
Total		12+

Figure 6.11: Table of settlers on LHI and likely population as at December 1848

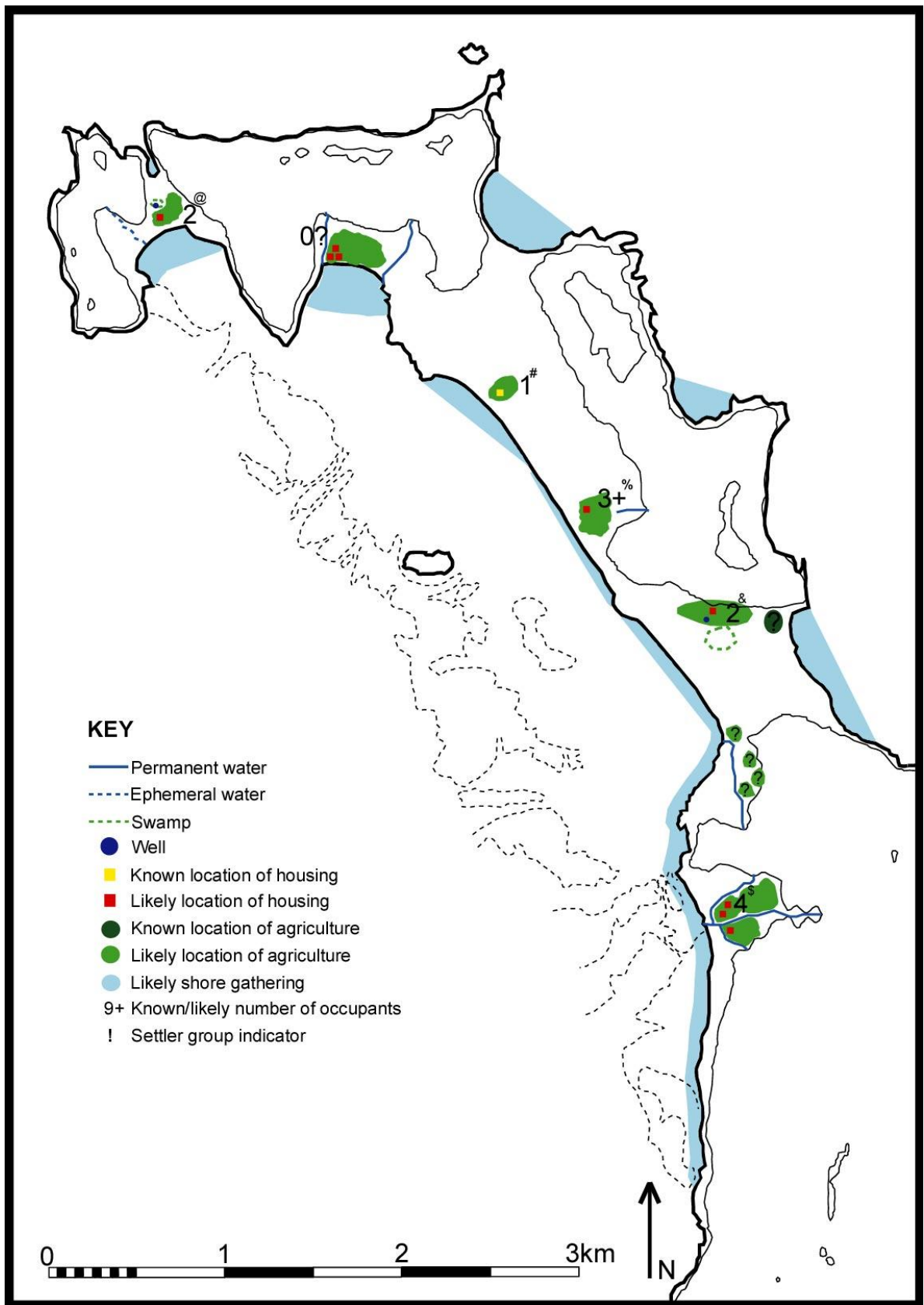


Figure 6.12: Map of settlement dwellings and gardens on LHI as at December 1848

LHI Under Scrutiny: 1853

The LHI settlement continued much in the same fashion throughout the late 1840s and early 1850s. The visit of the HMS *Herald* and HMS *Torch* in 1853 and Captain Denham's and J.D. MacDonald's resulting reports provide the first detailed accounts of the LHI settlement since White's visit nearly 20 years prior. Denham's report included details of the people residing on the island and their trade with passing ships:

“It appears then, that... Andrews, Mosely, and Wright... with their serving men, wives, and children, comprise a little community of sixteen persons, not only derive a comfortable subsistence but store up the overplus of their crops for whalers and other vessels who... approach the Island and require refreshments. The supplies in question are of a sort very much to be desired...and consist of pigs, poultry, potatoes, and every variety of fruit and vegetables, not omitting that indigenous esculent the palm cabbage nor the fish which abound”(Denham 1853:12).

The 16 persons that Denham mentions included the three named families, plus four single men who had arrived in the previous three to four years; Bliss, Gibson, Brown and Cruze. The Middletons and Williams made up the 16 mentioned by Denham (see Figure 6.13). Bliss and Gibson probably established and worked their own properties, with Bliss at an unknown location and Gibson to the south of Windy Point adjacent to the Moseleys (see Figure 6.14). Denham's reference to the three named settlers having 'serving men' indicate that these four men may have been 'employed' by the more established families; Brown and Cruze are recorded as having lived and worked on the Andrews holding, while Gibson and Bliss may both have at least 'helped out' at the Moseleys and/or the Wrights. Macgillivray, who was a member of Denham's expedition, wrote of Moseley having two 'assistants', which would be an apt description if Bliss and Gibson were working their own holdings in addition to helping at the larger establishments in exchange for produce and other necessities they could not grow or acquire themselves (David 1995). The likely culture of sharing and generous bartering of goods between islanders is confirmed by Macgillivray writing about the islander's generosity during the party's stay:

“All the settlers extended their hospitality to the camp party during their short stay, supplying them each morning with milk, dried fish, fresh pork, potatoes and other vegetable as gifts, in marked contrast to the inhabitants of Tristan de Cunha, who had demanded payment for everything in spite of the fact that the *Herald* had supplied them with so many necessities. MacGillivray recorded his deep sense of gratitude for the generous hospitality all the settlers had shown their visitors” (David 1995: 35).

MacGillivray's mention of milk is curious, as it indicates the presence of dairy animals on the island; nanny goats may have been kept for dairy purposes at this time. However, it may also support what would otherwise appear to be a passing statement of little veracity by MacDonald concerning the presence of horned cattle on the island (MacDonald 1853:14). Cattle are thought to have been introduced to LHI around 1869, but it is possible that they were introduced to the island by 1853, and perhaps failed to flourish, before being re-introduced successfully 15-20 years later (Hill 1869; Moore 1869). MacDonald also lists other introduced animals, confirming the presence of dogs, pigs, chickens, geese and ducks, while also revealing the introduction of rabbits and cats to the island. MacGillivray confirmed the presence of cats, dating the introduction of three animals from a passing whaling ship from five to six years prior to their visit (1847-1848), and noted their supposed impact on the numbers and behaviour of the woodhen (David 1995).

By this time a number of crops had been introduced to the island and were generally flourishing in the fertile soils available across the island. Bananas, potatoes, melons, cape gooseberries, eggplant, mint, 'vines' and castor oil plants are all mentioned directly as well as assertions that 'every description of fruit might be cultivated advantageously' (MacDonald 1853:16). Standard strategies for land clearance and garden protection had also been established:

"During the winter the winds... often proves destructive to vegetation, by blowing the finely divided spray from the reef over the unprotected parts... From May to September it is most severe, and its blighting influence is frequently observed within a few hours, bananas, potatoes, and many other plants becoming quite black and shrivelled up... These effects are guarded against by clearing the land in small patches, preserving a rampart of tall trees around each, as a protection to its own area. It would be imprudent, therefore, to clear large tracts of land neglecting this precaution..." (MacDonald 1853:14).

The *Herald* visitors also recorded tantalising hints about the use of native plants on the island, with general comments made about the abundance of firewood and fine, close grained timber, and more specific information relating to the extensive use of the 'cabbage palm' (likely to be *Howea forsteriana*) in island building and the successful use of large banyan roots (*Ficus macrophylla columnaris*) for table tops and other furniture making (Denham 1853; MacDonald 1853). MacDonald also records the occasional consumption of pandanus (*Pandanus forsteri*) fruit by island children as well as that of an unidentified species of medium size crab found in the lagoon. The use of muttonbird for food is also

mentioned and its importance is demonstrated by the islanders being aware of their seasonal arrivals to within a few days (David 1995) Muttonbirds were also a source of a valuable by-product which would have been very important to daily life:

“The large glands which lie near the stomach of these birds (probably those of the corpus glandulosum) yield an amber-coloured oil which burns well, being used as a substitute for whale oil when such cannot be procured” (MacDonald 1853:14).

MacDonald also describes two types of ‘mutton bird’; a likely indication that the islanders were exploiting both Fleshy-footed shearwaters (*Puffinus carneipes*) and Wedge-tailed shearwaters (*Puffinus pacificus*) in the same way and referring to them collectively as ‘mutton birds’ (MacDonald 1853:14). Other birds mentioned in these accounts include the LHI Currawong (*Strepera graculina crissalis*), which was so tame MacGillivray was able to shoot several and found them to be ‘good eating’ (David 1995:33). Other species of land bird that MacGillivray encountered did not end up as dinner, and there is one account of a visit to a Booby colony that is an interesting indication that their use and range on the main island may have changed by this time. A special trip was made to the northern part of the island to visit a booby colony that had been sighted from the ship, and while specimens were collected for identification, it appears that none of the birds were taken for food (David 1995:35). The need to make a special trip to a specific part of the island view boobies (*Sula tasman* and/or *Sula dactylatra*) is a likely indication that their range and numbers had been significantly reduced by this time, as earlier accounts suggest the ‘gannets’ were thick on the ground and easily located along the sandy lagoon shores.

Denham’s visit also resulted in the production of a map of LHI (see Figure 3.3), which not only showed the (labelled) locations of the Andrews, Moseleys and Wrights holdings, it also illustrated a small occupation at the northern end of lagoon beach (C. Williams), two areas of activity in Hunter Bay which either denote gardens, dwellings or both, and a series of four areas to the south of the Moseley property which are likely gardens. The areas marked in Hunter Bay activity are also likely gardens, but who might be maintaining them is not clear. The Andrews are likely candidates as it seems that upon his departure Poole ‘transferred’ the Hunter Bay holdings to the Andrews, who apparently maintained a claim to it until they in turn transferred land at the western end of the bay to William Nichols in the 1860s or 70s. The gardens south of the Moseleys are likely to have been maintained if not established by them, although there is an equally strong change the gardens were established at an earlier time when the Poole-Dawson-Foulis enterprise had a

large number of employees. Interestingly, the Middleton’s property is not marked on Denham’s map, nor are they mentioned in any of the correspondents’ reports, yet they were occupants on the island until 1855 and it seems they were counted in the population count quoted in Denham’s report.

Following the visits of the *Herald* and *Torch* five more settlers arrived on the whale ship *Belle*; Nathan Thompson, Jack Brian, George Campbell and three women from the Gilbert Islands (Kiribati), Bogue, Boranga and Bogaroo. The *Belle* group established themselves at a new location between Signal Point and Ned’s Beach, where Thompson built the first timber dwelling on the island, using pit sawn timber and local calcarenite (Rabone 1940; Nicholls 1952). The establishment of the *Belle* group would have prompted the return to heavier use of the Ned’s Beach and Hunter Bay areas, as well as intensified lagoon beach and Signal Point foraging. Other areas of marine gathering are likely to have continued much as they had been previously, however hints of reduced booby harvesting and the likely loss of the White-throated pigeon by this time suggest that the settlements reliance on such easily gained native foods was almost at an end. The gathering of other resources such as mutton bird, shellfish and fish would have continued, but the likely increase in introduced animal resources and the loss and/or reduction of several favoured prey would have prompted at least a small shift in subsistence. The excavation of several wells by this time also signalled the beginning of households being more self contained with regards to their everyday survival needs; most settler families would have been able to establish and maintain gardens that produced most of their daily needs by this time, and the construction of wells would have reduced their reliance on carting surface water to their houses and dwellings, which in turn would have enabled settlement more distant from permanent surface water, an important development for future growth on LHI.

Year/Map Symbol	Settler Group	Population
1853		
@	Middleton	2
#	C. Williams	1
\$	Wright	4
%	Andrews/Cruze?/B. Brown?	5
&	Moseley	2
=	Bliss?	1
~	Gibson?	1
Sep 1853	At Denham's Visit	16
*	Thompson/Brian/Campbell/Bogue/Boranga/Bogaroo	6
Total		22

Figure 6.13: Table of settlers on LHI and likely population as at December 1853

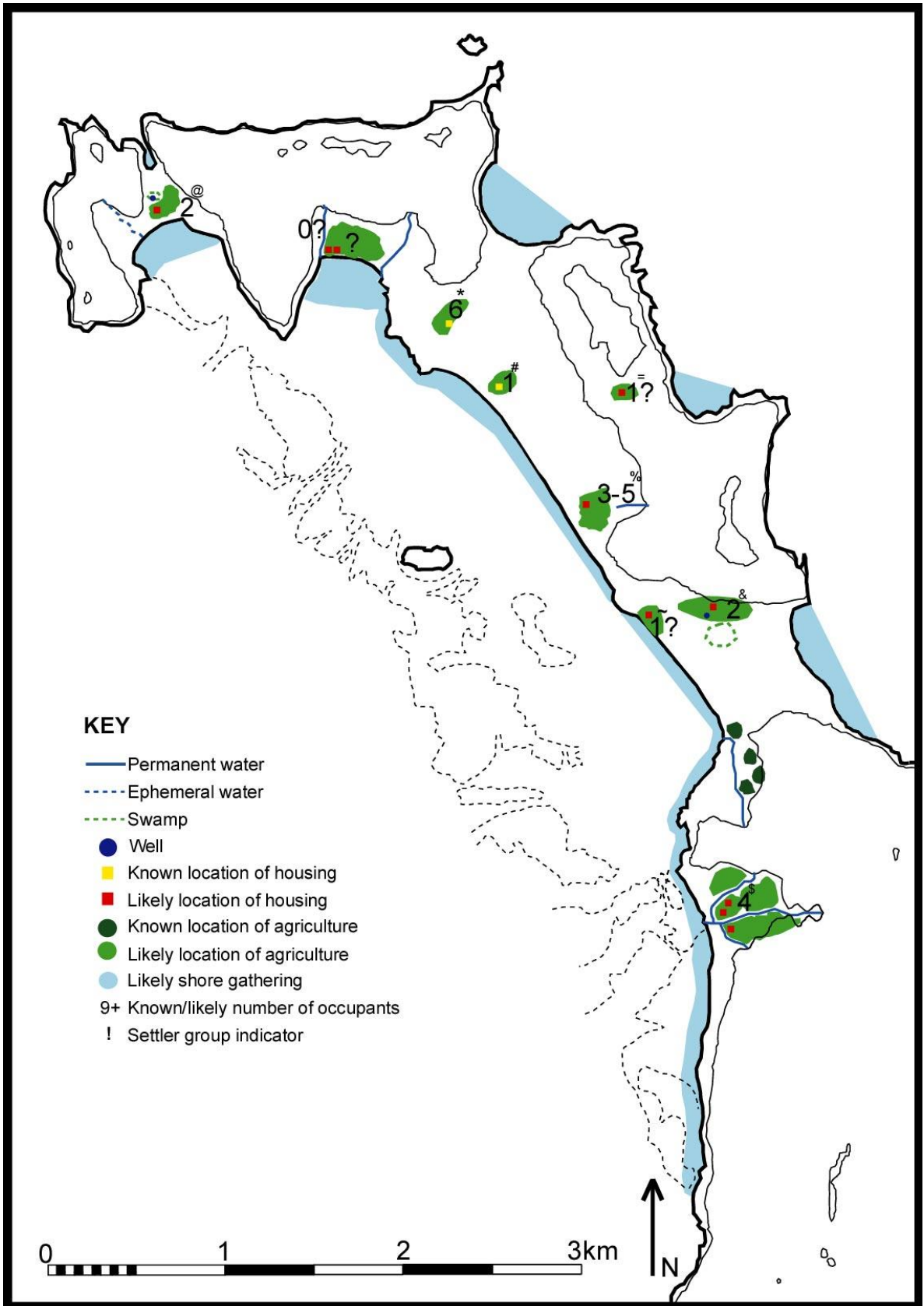


Figure 6.14: Map of settlement dwellings and gardens on LHI as at December 1853

Continuing Prosperity: 1858

The pattern of settlement continued much as it was recorded in 1853, with the occasional addition of new settlers (see Figure 6.15), who for the most part started to cluster around the previously established areas of occupation (see Figure 6.16). The Middletons had left the island and their residence was taken up by Captain Stevens, his son Campbell, and Perry Johnson who had abandoned his job as crew on the *Will 'o the Wisp* and laboured for the Stevens. Charles Williams, the Andrews, Moseleys, Wrights and William Gibson all continued on where they were, while the new settlers the Fields, Cooks, and possibly Whybrows and Lloyds had arrived, most of whom settled in the area between Signal Point and Ned's Beach. The Thompson household shrank somewhat, as Jack Brian left LHI soon after arriving and George Campbell passed away in 1856; but had regained one as Thompson and Boranga had married and produced a son (Nichols 2006; Nicholls 1952; Rabone 1940). For a time the Thompson's also nursed an ill sailor, Ned Nesbitt who had been dropped off on the island in order to recover, possibly from scurvy. Ned stayed with the Thompson's for some time, but appears to have established his own dwelling and gardens at the Ned's Beach end of the Thompson's area near an area possibly known as 'Whybrow Ridge' (Nichols 2006; Rabone 1940). The Whybrows were another family of settlers who arrived at some point around this time, and the area they farmed was known as 'Whybrow Ridge', the exact location of which is not known, but is likely to be in the vicinity of Ned's Beach and the Thompson 'property' (Edgecombe 1987; Nichols 2006; Nicholls 1952; Rabone 1940). The Lloyd family settled somewhere to the south of the Thompson property and probably adjacent to the Whybrow's occupation, as later sources indicate Whybrow was a witness relating to an incident on the Lloyd property (Cloete 1869; Edgecombe 1987; Nichols 2006; Nicholls 1952; Rabone 1940). Less is known about the Cook occupation, except it comprised two brothers, their wives and three children who came to the island expressly to collect and export feathers. Where they settled is unknown, but they may have occupied the area near where gardens were marked in 1853 south of the Moseleys; alternatively they may have lodged with one of the established families, however it is not clear which of the established settlers may have had room to accommodate at least seven tenants for a couple of years or more.

What type of feathers the Cooks may have been harvesting is not known, but there is a good chance that they collected mutton bird feathers, at least from those consumed by other islanders. Sources indicate that ABC collected mutton bird feathers for export for

furniture and bedding stuffing, but had difficulty selling them due to their rank odour, and it is possible that the Cooks sought to repeat the venture (Nicholls 1952; Rabone 1940). If they encountered the same difficulty as ABC, it may explain their departure from the island within a few years, although it is possible that they had either a method of ridding the feathers of their smell or were targeting another species. However, by this time it is likely that the only species of suitable numbers would have been either mutton birds or other seabirds which would have had a similar smell. The arrival of the Cooks and their feather enterprise saw the first export trade trialled on the island since the ABCs attempts to sell the same feathers, as the only other island product of export potential was still being in its infancy. The ‘LHI red onion’, a small variety valued for its pickling and keeping qualities would have been growing by this time, originating from a handful of onions found washed up on the beach by Mrs Andrews in the early 1950s (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). Later sources show that the onion was the only significant export item for some years, but during the 1850s it would have been an exclusively domestic product.

The island’s growing agriculture based society would have seen a likely reduction in the amount of native foods collected per household, but the slow population increases probably would have maintained exploitation rates at approximately the same level. There is a possibility that newly arrived settlers may have exploited native foods less than settlers who had been established for some time and had successfully incorporated them into their regular diet. Conversely, new arrivals may have been more reliant on such resources until they could establish productive gardens for their own use, and to trade for other supplies.

Year/Map Symbol	Settler Group	Population
1858		
@	Stevens/Johnson	3
#	C. Williams	1
\$	Wright	4
%	Andrews/Cruze?	4
&	Moseley	2
~	Gibson	1
*	Thompson/Bogue/Boranga/Bogaroo	5
^	Cook	7
!	Field	2
<	Lloyd?	3
>	Whybrow?	5
{	Nesbitt	1
Total		38

Figure 6.15: Table of settlers on LHI and likely population as at December 1858

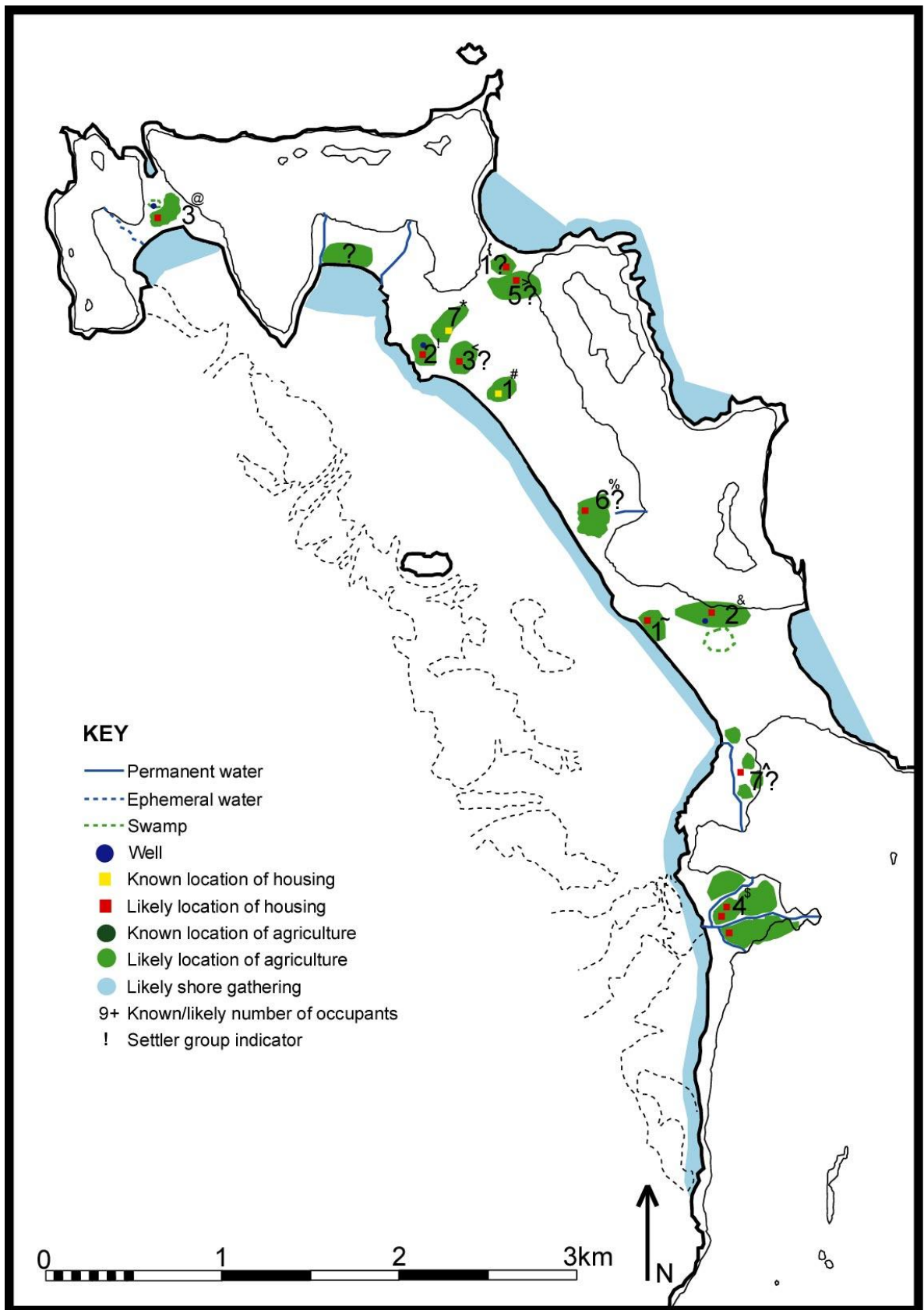


Figure 6.16: Map of settlement dwellings and gardens on LHI as at December 1858

Slow Decline: 1868

The next phase of settlement that is well recorded is the late 1860s, as a case of homicide on the island in 1869 prompted the despatch of the Water Police Magistrate P.L. Cloete to investigate and rule on the case. Cloete was accompanied by R.D. Fitzgerald from the Surveyor-Generals department, naturalist E.S. Hill and the director of the Sydney Botanic Gardens, C. Moore; all of whom wrote of the island and detailed areas of particular interest including a comprehensive list of the settler households and their occupants, descriptions of housing, gardens, health, livestock, trade, basic settlement organisation and island flora and fauna. The result of Cloete's investigation found the case one of justifiable homicide, while providing one of the most comprehensive collections of primary accounts of LHI settlement in the 19th century. The snapshot map shows the settlement at the end of 1868, before the incident that prompted Cloete's visit, but which otherwise reflects the nature of the settlement in 1869, and for some years prior, while allowing the 1869 accounts to illustrate in detail the nature of life and landscape on LHI during this period.

Of the settlers present in 1858, most who remained on the island in 1868 continued where they were previously. One exception is Perry Johnson, who upon going to Sydney in 1860, met Sarah and returned to the island where they were married and established a new household and farm in the Big Creek catchment, north of the Wright's farm (Edgecombe 1987; Nichols 2006; Nicholls 1952; Rabone 1940). The Wright's had left the island in the early 1860s, and their holdings were left in the care of Edward (Ned) King and Charles Thorngrave, two new arrivals on the island from the ship *Gleaner* in about 1862 (Nichols 2006; Rabone 1940). Thorngrave left at some point prior to 1869, while King continued on at the Wright's farm, eventually hand cutting drainage ditches around the property in the same form as those excavated by Perry Johnson. Other property transfers included the occupation of William Gibson's property by the Lewis couple, who were installed as caretakers for the holdings which had been bought from Gibson by Captain Starch of the *Gleaner* in 1865 (Nichols 2006; Rabone 1940).

Other new arrivals all established new holdings and mostly new gardens around the island: the Fields arrived in 1855 and settled at Signal Point, Captain Spurling settled somewhere along the lagoon foreshore in 1861, the Wainwrights settled just north of the Johnsons in 1867 and the Mooneys settled somewhere in the vicinity of Middle Beach in 1867 (Edgecombe 1987; Kelly 1984; Nichols 2006; Nicholls 1952; Rabone 1940). Leonard, a deserter from the whaler *Gayhead* 1864, married the Lloyd's daughter Alice and

lived with them for a period before establishing his own farmstead in an unknown location where he and Alice lived for a time prior to his death, which was the subject of Cloete's investigation (Cloete 1870; Nichols 2006; Nicholls 1952; Rabone 1840). An argument between Leonard and his father-in-law Lloyd escalated when Leonard attacked Lloyd, who in turn stabbed Leonard in the shoulder in self-defence. Leonard then retreated back to his home to retrieve a gun in order to kill Lloyd, but bleed out after his arrival home. Cloete deemed it a clear case of self defence and the matter went no further except a stern reprimand to Leonard's wife Alice, who had apparently incited the initial argument (Cloete 1870; Hill 1869). Other shifts in established households occurred during this period: Mr Andrews passed away in 1860, leaving his wife and daughter, who in turn met and married Captain Thomas Nichols in 1862, and continued on at the Andrews holding with Mrs Andrews. Thomas Nichols' brother William also arrived on the island around the same time, and established his own farm at North Bay, on the other side of Mt Eliza to the old Middleton and current Stevens holding. The Thompson family also changed with the death of Nathan's son Hugh and wife Boranga in 1864, Nathan's marriage to Bogue in 1865, and the likely birth of their first child in 1865-66.

The accounts of Cloete, Hill, Fitzgerald and Moore all indicate that the LHI settlement was slowly but steadily increasing in sophistication with regards to housing, trade and social codes of conduct governing important aspects of daily life. The descriptions of houses fit not only photographs of later dwellings, but also archaeological evidence of architectural designs which prevailed on the island until the late 19th century:

“The houses are well built of split palm battens thatched on roof and sides with palm leaves. The leaf hangs down and the stem is bent over one horizontal batten and outside the next lower, and arrangement which gives a very white, clean, appearance to the inside, somewhat resembling basket work, and very distinct from any other style of building”(Fitzgerald 1870:37).

“In...two or three exceptions...the houses are raised on calcareous blocks, procured close at hand, a couple of feet of base course, then boarded up with Australian pine, and painted, and roofed with galvanized iron”(Hill 1869:45).

“The designs are nearly all alike – one entrance-door in the centre, which forms a room of the better description; at either end are one, two or more small bedrooms, as occasion may require, but no fireplace”(Hill 1869:45).

“The kitchen, or general room, is detached, and forms one compartment, with a fireplace in one end and larder at the other, the centre side occupied by a large table for meals, with a long stool at either side”(Hill 1869:45).

“Each house is surrounded by out-houses, the sides of which are sometimes not thatched, and have a very light, tropical appearance. They consist of barns, fowl-houses, houses for goats, pigs, and dogs, and drying floors for onions. Each house, with its surrounding building, encircled by a fence of split palms and backed by lemon trees, arching banyans and clustering palm trees, is a picture of tropical comfort and beauty – not often to be seen or easily forgotten”(Fitzgerald 1870: 37-38).

Some aspects of island life of primary importance to everyday life on the island started to become regulated by common consent amongst the island community:

“There are certain recognised regulations among the people which are rarely infringed upon; such as definition of hunting grounds, regulated prices of produce, boundaries of cultivation grounds, which must not be approached nearer to each other than will allow a sufficient brake of palms to protect them against the wind”(Hill 1869:45).

In contrast, other aspects of community life which were of less immediate importance to daily subsistence and earning power continued to be fairly low key, partly as a reflection of the islanders isolation and lack of interest from colonial authorities, but also the islanders general lack of immediate need or interest in pursuing a solution to their need. Formal education, health care, postal services, community record keeping and regular religious services were all wanting on LHI, but steps were beginning to be taken to remedy some of these wants. A number of islanders were beginning to provide some tutoring to island children, but these lessons were irregular and of limited content (Lord Howe Island Central School 1979). An informal registrar of births, deaths and marriages, Captain Spurling, was appointed by the islanders immediately following the suggestion of Cloete for the need of such an office, with Spurling later taking on the responsibility of delivering mail around the island. The only religious observances comprised a suspension of work on Sundays, and health care was entirely in the hands of the islanders, using a limited selection of general remedies such as Epsom salts, castor oil, liquor and aloe vera (Hill 1869; Kelly 1984). Most households maintained their own rudimentary medicine chests, dosing themselves as required, while the island women provided their own midwifery services, with usually one or two particular women taking care of most island births (Kelly 1984).

Despite these community shortages, the general standard living for LHI residents was comfortable, as trade with whaling and other ships continued, however it was on an appreciable decline by 1869. Island wide prices on the popular trade commodities were set, and ensured that everyone's livelihood was protected:

“Turkey's may be obtained in barter or cash at 10s a pair; fowls, 3s; ducks, 3s; geese, 12s; pigs and goats, at 3d. per lb. alive or weighed as they stand. Fuel may be had at 5 dollars or £1 a cord, cut and stacked on the beach; and water at any season from the big creek at the south end, west side, but it can be only rafted out by boats”(Hill 1869:44).

Another source from a whaling captain who visited the island during 1869, only describes a bartering system for trade, rather than cash prices, while Fitzgerald indicates that both a cash trade and barter were conducted:

“My first visit to the island was in 1869 on the barque *Minnesota*. The islanders exchanged fruit, vegetables and fowls for calico, flour, sugar, tea, tobacco, soap and shoes”(Poole n.d. in Nichols 2006:14).

“They seem to be fairly provided with the necessaries of life, but to lack money, as their trade with the whalers is, in great part, carried on by barter. They exchange pork, potatoes, maize, fowls, and onions, for tea, sugar, clothes, &c., which must be taken at the whalers' valuation”(Fitzgerald 1870:37).

Whether prices were set for the main fruit and vegetables traded, such as potatoes onions, bananas and citrus is not clear, but it is likely at least with regard to onions. The LHI red variety was now being shipped regularly to the Sydney market by either visiting ships, or by a small 14 ton ketch the *Sylph* which was owned in partnership by Thompson, Field and Wainwright and running from 1867 onwards (Hill 1869; Nichols 2006; Nicholls 1952; Rabone 1940). The *Sylph* ran between Sydney and LHI up to four times a year, and while it predominantly brought onions and passengers to Sydney and returned with passengers, mail and supplies, it also occasionally carried other cargos such as pigs, fish, poultry, bananas and sweet potatoes (Edgecombe 1987; Nichols 2006; Nicholls 1952). The LHI red onion constituted the only main export to the Sydney market, and at this time it was a supplementary activity to the ship trade, despite the facility of an island trading ship for the first time. Other crops grown at this time were considerably more varied than previously recorded, and it seems the settlement's capacity to try crops beyond the main staples was increasing. Fruit crops included lemon, orange, banana, plantain, pawpaw, passionfruit, yellow guava, grapes, cape gooseberry and strawberries, all of which appeared

to do well, save the depredations of berry and grape loving birds. Maize, potatoes, onions and pumpkins were all grown in very large quantities, while more occasional plants such as coffee, castor oil and arrowroot also flourished (Cloete 1870; Hill 1869). Moore also noted the use of some native plants, largely as substitutes for conventional foods when they were unavailable. A species of *Melaleuca* which the islanders called ‘Kilmogue’ was used as a very satisfactory tea substitute, while the islanders referred to both the ‘Thatch’ (*Howea forsteriana*) and ‘Curly’ (*Howea belmoreana*) as ‘cabbage palm’, indicating the islanders were still occasionally harvesting the edible crown of the young plants as an alternative to cabbage (Moore 1870:26-27).

These accounts also provide information on the continual changes in native fauna populations, the impacts of introduced animals on the island and the gradual changes in the vegetation regime in some parts of the island. An attempted ascent of Mt Gower by several members of Cloete’s party and other forays around the island afforded opportunities for them to observe and collect floral and faunal specimens of interest, and several members noted changes in the faunal regime and gave indications of the species still being exploited:

“The island, at one time abounded with large wild pigeons – so much so, that within the past twenty-five years, it was no unusual thing for a man to snare by aid of a stick and string, fifteen or twenty birds of a flock without the others taking the least alarm. At the present time not a single specimen could be obtained”(Hill 1869:42).

“The paraquet [sic], also, was a nuisance to the cultivators; once appearing in flocks, now I saw but a solitary pair in their rapid flight through the foliage, and recognised them only by their peculiar noise”(Hill 1869:42).

Hill also writes of large eels to be found in all the fresh water ways of the island, and of the occasional availability of oysters, while Fitzgerald mentions the hunting of woodhen on the southern mountains, and the opportunistic catch of a magpie as part of an impromptu camp dinner. The impacts of introduced fauna and land clearances are also mentioned, and are rather telling of the potential damage wrought in just over 30 years of occupation:

“In the olden time, twenty-four years back, a number of cats were sent ashore from a whale-ship and turned adrift. These soon became populous, and found an easy prey in the pigeons, parrots, and brown hens, decimating the two former and driving the latter to the mountains. These cats are still numerous and all black, and are always destroyed when a chance offers”(Hill 1869:43).

“Mice, within the past two years, have accidentally been introduced. These now swarm the island, and promise to become a great nuisance; they have taken to the fields, and burrow in every knoll...the island, before their introduction, swarmed with centipedes of large dimensions...These, now, however, are fast disappearing, owing, as it is said, to the mice, which must prey upon them.”(Hill 1869:43).

“Every part of the island is covered with a dense vegetation, the undergrowth being kept comparatively clear by pigs and goats, which are allowed to roam at large. These crop off the lower branches of the trees, and in too many instances, it is feared, have destroyed the smaller kind of plants altogether”(Moore 1869:18).

“...much of it formerly under cultivation is now left untilled, the demand for produce having of late years greatly failed. These as well as some abandoned clearances on the flats are now almost wholly occupied by two grasses which are common about Sydney...‘Couch’..and ‘Tufty-grass’, the former growing most luxuriantly, and forming a superabundance of food for the horses and cattle now upon the island”(Moore 1869:18).

Rabbits were another introduced species present on the island at this time, but Hill observes that they are fortunately confined to Blackburn, or ‘Rabbit’ island, thus limiting any potential damage (Hill 1869:44). Interestingly, the only native food mentioned in these accounts which is unfailingly described as abundant are fish, with numerous species listed and this is a likely reflection of the continued decline of earlier exploited resources and the increasing agricultural variety available to the islanders.

Year/Map Symbol	Settler Group	Population
1868		
@	Stevens	1
#	C. Williams	1
\$	King	1
%	Andrews/Nichols/Cruze?	7
&	Moseley	2
~	Lewis	2
*	Thompson/Bogue/Bogaroo	5
!	Field	2
<	Lloyd	2
>	Whybrow	6
{	Nesbitt	1
x	W.Nichols	1
w	Johnson	2
^	Spurling	2
=	Mooney	3
v	Wainwright	4
o	Leonard	2
Total		44

Figure 6.17: Table of settlers on LHI and likely population as at December 1868

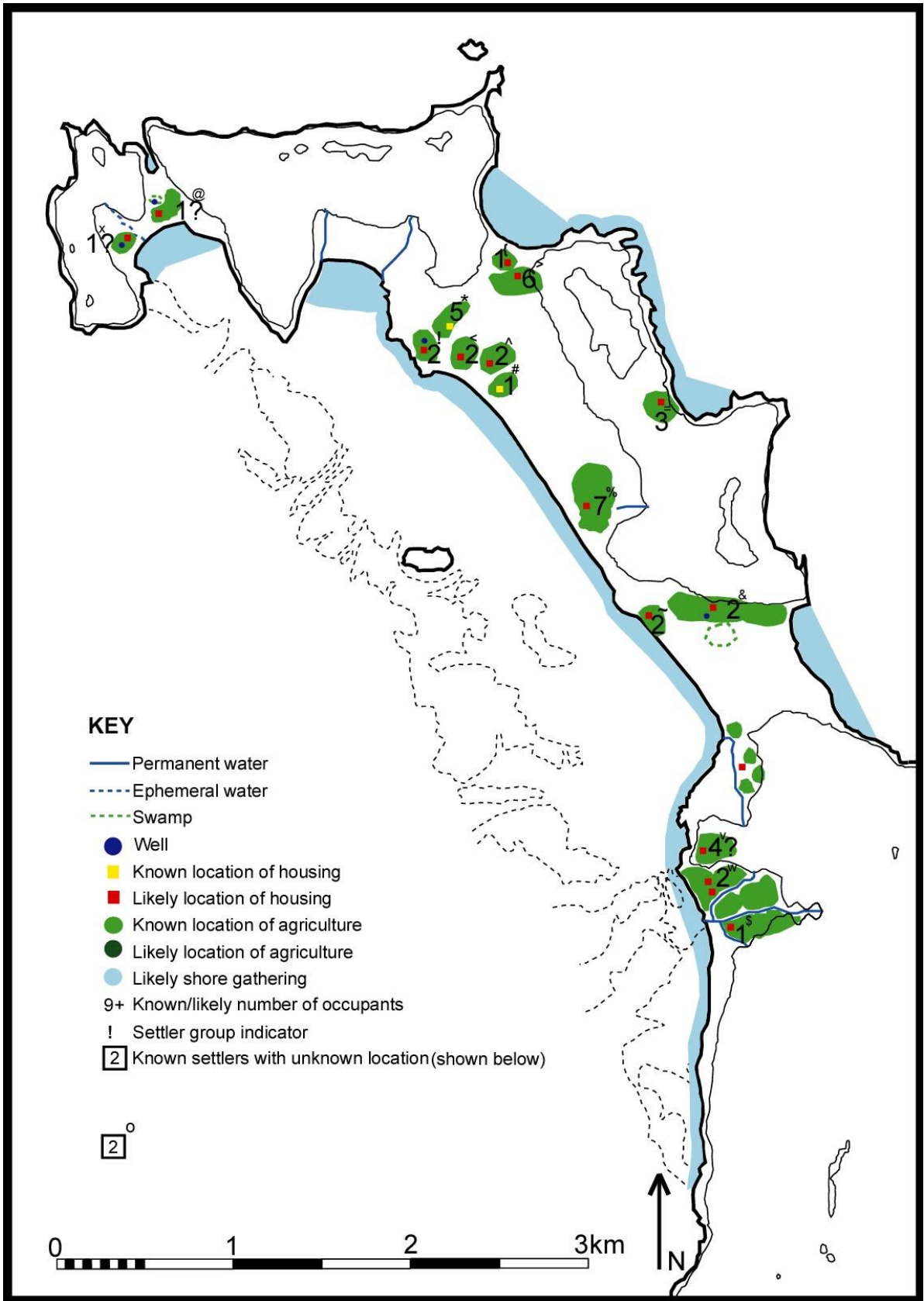


Figure 6.18: Table of settlers on LHI and likely population as at December 1868

Lowest Ebb: 1878

Within a decade of Cloete's visit, the pinch of the sliding ship trade was being significantly felt, as evidenced by another well recorded visit by a colonial ship, the HMS *Pearl*, in 1876. The ships surgeon Alfred Corrie wrote at length of what they found on the island, and the economic situation he described in addition to the declaration of a forest reserve on the island in 1878, prompted the colonial government to send a resident official to the island. Corrie's descriptions of island life quite clearly illustrated the dire effects of the loss of ship trade on the island, which was further compounded by the loss of the *Sylph* in 1873:

“But now this once much frequented and favoured little spot is apparently quite deserted; the old families have lost all zeal for cultivation, having to live as it were from hand to mouth, see the fruits of their labours decaying and rotting in their store-houses”(Corrie 1878:142).

“One cannot help pitying them sincerely; they are naturally now so attached to one another, being in reality but one large family, and having lived such a quiet and peaceable lives so long together, that I suppose many of them would rather die of inanition than leave the spot”(Corrie 1878:142).

Apart from the reduced trade and lack of enthusiasm for agriculture, Corrie largely describes an unchanged settlement from that described seven years prior. House design and construction was unchanged, introduced livestock species remained the same, principal dietary staples were of continued importance and the lack of education, health and religious services remained. Interestingly, Corrie mentions the presence of an island 'library' which burned down two to three years before his visit, although where this might have been located is not known. Other social and leisure activities mentioned included the 'sport' of pig hunting, occasional games of 'rough' cricket and the night time playing of the American card game 'Euchre'(Corrie 1878:140). An interesting addition to the list of crops is that of tobacco, which apparently thrived, although whether it was present as an experimental cash crop or if the islanders processed and used their own product is not known (Corrie 1878:137). Corrie also estimated the amount of land used for active agriculture to be 40 to 50 acres, while the acreage of previously cultivated land which subsequently became colonised by either 'couch' or 'tufty' grass was a sizeable 150 to 200 (Corrie 1878:141). This disparity between previously cultivated areas and those of continuing use in 1876 is also a significant indicator of the magnitude of the economic

depression the island experienced. Corrie felt that the abundance of pasturage would be very suited to the running of sheep on the island for domestic use and for market, but suggested that this venture would not be possible unless the island's large number of big hunting dogs was curtailed and regular transport for the stock to market was available (Corrie 1878:142).

The level of use of native resources is not really evident from Corrie's account, although there are some hints that native subsistence was of dwindling importance. The islanders' subsistence was described by Corrie (1878):

“Their principal articles of diet are pork, fish, fowls, onions, potatoes, &c., which they have around them, and anything they are able to procure from passing vessels”(140).

The only mentions of native resources were the sustained abundance of fish and the continued use of mutton bird products:

“...mutton birds (puffins), so called by the islanders. The settlers obtain a dark-coloured oil from this bird, which is used to burn in lamps when whale-oil is not procurable, and occasionally the flesh is eaten”(Corrie 1878:138).

The ‘occasional’ use of mutton birds for food, rather than the more regular use indicated in previous years is a likely reflection of both the overabundance of agricultural goods, which were ‘rotting in their storehouses’, and a likely reduction in the range and populations of the mutton birds (Corrie 1878:139).

The downturn in the island's economic fortunes also saw a slight population decrease, this being a product of less established and financially robust groups leaving the island, while those who had been resident for longer stayed on (see Figure 6.19). Following the death of their son-in-law Leonard, the Lloyd's left the island, while their daughter remained and eventually married Campbell Stevens. The Lloyd's traded their property with a new settler Jenkins in the early 1870s, and a surviving inventory list gives an incredibly detailed record of the household contents of a typical LHI family during the mid 19th century (see Figure 6.20; Kelly 1984). Jenkins subsequently left the island around 1876, and the eventual fate of the Lloyd's holdings is unknown. Other property changeovers happened during this time, with Captain Starch returning to the island and taking up residence at the property where the Lewis family were previously caretakers, who subsequently left the island (Nichols 2006; Nicholls 1952; Rabone 1940). William Nichols and his family moved from their North Bay lodgings to the eastern end of Hunter Bay,

Year/Map Symbol	Settler Group	Population
1878		
@	Stevens	2
#	C.Williams	1
\$	E.King	1
%	Andrews/Nichols	9
&	Moseley	2
~	Starch?	1
*	Thompson/Bogue/Bogaroo	7
!	Field	1
x	W.Nichols	3+
w	Johnson	2
^	Armstrong	1
=	Mooney	3
v	G.King	2+
<	Lucas?	1
>	H.Wilson	1
"	T.B. Wilson	1
o	Brown?	1
Total		39+

Figure 6.19: Table of settlers on LHI and likely population as at December 1878

	Outside		Inside	
Corn bin	3 Rakes	2 Spare Doors	2 Boilers	1 Looking glass
2 Ladders	2 Tubs	4 Gimlets	1 Large Dish	1 Gun
2 Mills, large and small	4 Axes	3 Ovens	1 Tea Kettle	1 pair Scissors
1 Wheel barrow	2 Barrels	1 Gouge	1 Chopper	3 Chairs
Seed Potatoes	1 Adze	2 Trowels	1 Rolling pin	2 Sofas
1 pair Stilliards	1 Hatchet	1 Screwdriver	Knives, Forks, Spoons	3 Tumblers
2 Blocks	1 Mall	1 Rasp	2 Tables, Kitchen	½ doz. Dinner Plates
1 piece Timber	1 Keg	1 Plain	1 Wash Board	5 Soup Plates
1 Grindstone	3 Wedges	3 Hammers	2 Pepper Boxes	11 Cups
1 Bellows	1 saw	1 Driver	1 Lamp	8 Saucers
1 Water cask	1 Brace and Bit		1 Oil Feeder	1 Table
5 Breaking up hoe's	2 Shovels		1 Saucepan	1 Safe
5 Chipping hoe's	1 Boat Spade		1 Knife Box	1 Chiffoniere
1 Garden Line	2 Reap Hook's		1 Washing stand (house)	1 Wooden Bowl

Figure 6.20: Inventory of the entire contents of the Lloyd's dwelling, which was exchanged with J.K. Jenkins, when the Lloyd's left the island in 1874 (Kelly 1984).

where William's brother's mother in law, Margaret Andrews, had transferred some land to him; land held by Mrs Andrews since the Poole-Dawson-Foulis partnerships' departure in 1847. Whether William Nichols maintained his gardens at North Bay is not known, but it is likely, as a descendant continued to work at least one garden clearing up until at least WWII (Birmingham 1984; Sainsbury 2004). Other parties who left during this time were the Whybrows, Ned Nesbitt and Captain Spurling, while the Wainwright family were all lost on the *Sylph* with the exception of Mr Wainwright, who reputedly died of a broken heart a couple of years after the *Sylph*'s disappearance (Nichols 2006; Nicholls 1952; Rabone 1940). Interestingly, despite the economic downturn on the island and the lack of reliable shipping, approximately four new settlers arrived on the island, and established new holdings or occupied existing dwellings and gardens. Henry Wilson settled as a tenant on the Johnson property, Joseph Lucas worked for Mrs Andrews before building his own holding next to Captain Starch's property, Geordie King and his family settled somewhere unknown at the 'south end' and possibly occupied the old Wainwright property, and William Brown settled at an unknown location (see Figure 6.21: Edgecombe 1987; Kelly 1984; Nichols 2006; Nicholls 1952; Rabone 1940).

The instatement of the first government official, Captain Armstrong as Forest ranger and Magistrate in 1878 saw a further two occupants by December 1878; Armstrong himself, and Thomas Wilson who Armstrong persuaded to stay on the island and teach the increasing number of children on the island (Nichols 2006; Nicholls 1952; Rabone 1940). Armstrong's presence, his efforts to provide new economic opportunities for the island and the slow recovery of some whaling trade meant that the situation of the LHI community was not as dire in December 1878 as had been recorded by Corrie in 1876, but as before many aspects of community life continued unchanged, particularly so early in Armstrong's tenure. The provision of regular education for the island children was the first step in the establishment of more regulated services on the island, and signalled the end of complete government apathy relating to the development of the island community and the welfare of its residents.

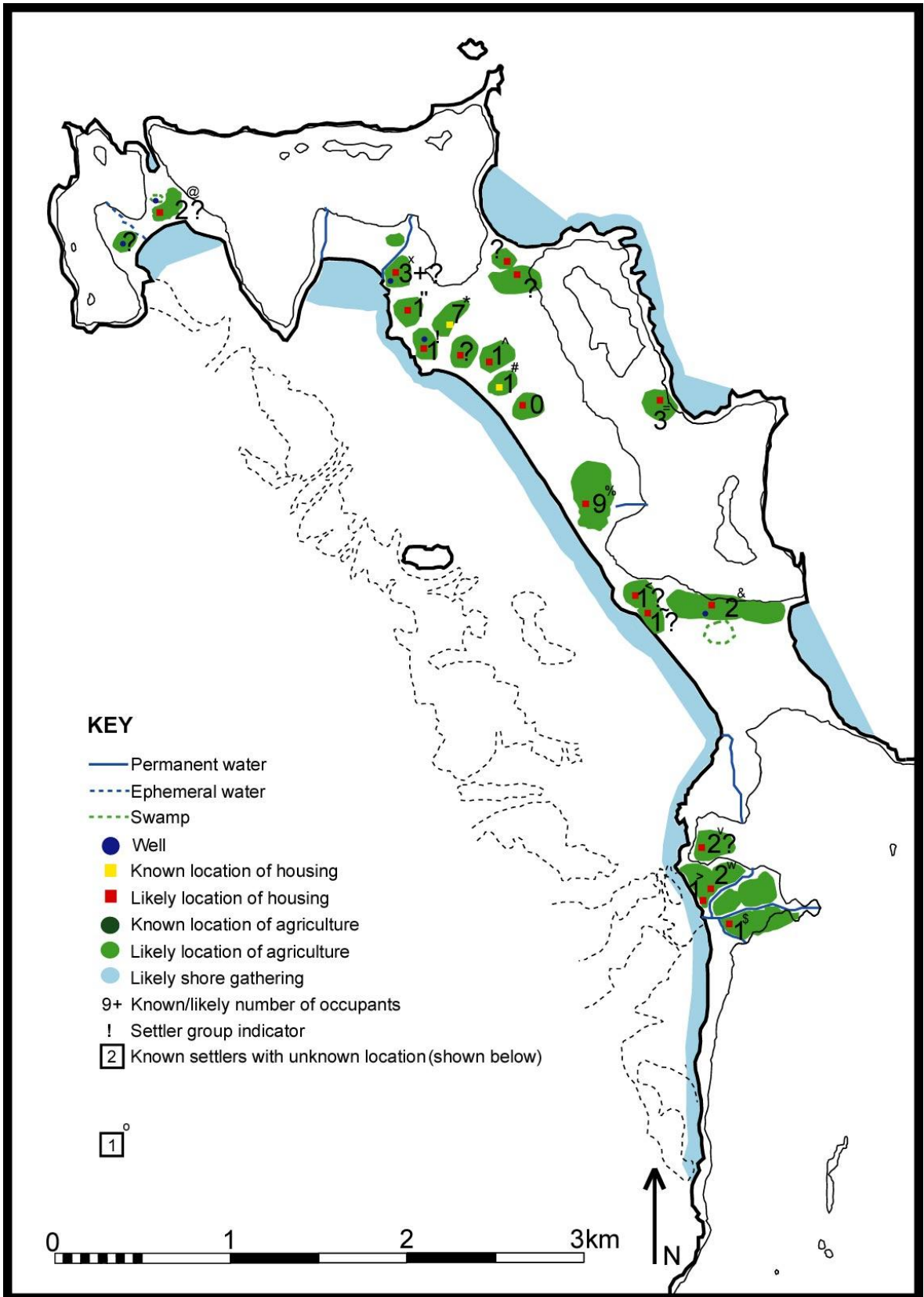


Figure 6.21: Map of settlement dwellings and gardens on LHI as at December 1878

Commissioner's Visit: 1882

Less than four years after Armstrong's arrival at LHI, conditions on LHI had improved appreciably. An unknown visitor writing in 1880 indicated that the previous crisis the islanders had suffered was largely alleviated:

“The population...principal occupation consisting in the cultivation of vegetables for the use of vessels calling at the island, but more especially in the production of the noted Howe Island onion, which is particularly valued for its keeping and pickling properties...The islanders live in comfort, and without deprivation, their surplus stock being bartered for articles of clothing, stores, and agricultural implements”(Anon 1880:no pagination).

The veracity of this particular author is not clear, but the positive effects of Armstrong's efforts on the island, the return of some shipping and the success of the onion trade are much more apparent two years later, when William Clarson wrote in detail regarding numerous aspects of the island's people, crops, lifestyle, economy and future prospects. Clarson writes in particular detail about the onion growing enterprise, other crops growing on the island, experimental plantings and their relative successes and speculates about future experimental species and potential exports (Clarson 1882):

“A single plantation [of onions] of less than two-thirds of an acre was estimated to contain 286,000 plants...as may be imagined this thick crowding of the plants results in small bulbs, even in a moist and favourable season...The greatly enhanced price of these ‘picklers’, however, offers some compensation for the reduced crop”(9-10).

“The yam, arrowroot, and taro, of the South Pacific, find a favourable home here; the custard apple, loquat, ‘mummy’ or papaw apple, kei apple (*akebia*), Brazilian cherry, coffee, granadilla, guavas, pomegranate, succeed admirably...The more generally grown fruits, such as peaches, nectarines, mulberries, tomatoes, grapes, passion fruit, Cape gooseberry, figs, melons, cucumbers, revel in the rich soils and favouring climate, and grow almost wild”(11).

“The apple, pear, plum, raspberry, strawberry, gooseberry, currant, and other fruits of cool latitudes, are said not to find the climate favourable, but from observation one is led to the conclusion that no adequate trial has been made with any range of varieties”(11).

“The island seems to offer peculiarly favourable conditions and affords good promise for the more extensive growth of tobacco, coffee, mango, custard apple, orange, ginger, liquorice, lechee[sic], longan, olive, pine-apple, wampee, and many other little grown sub-tropical plants, giving fruit or other products of exceptional values in the markets of the large Australian towns. But as yet no adequate trial has been made of the varied resources offered by the soil and climate of Lord Howe Island”(12).

“The rapid growth of the coffee plant, its early fertility and abundant yield, as attested by the few trees planted, point to this crop as one likely to be of great commercial importance to the island. As reported on at the late Exhibition the coffee grown on Lord Howe Island is equal to the very best samples from Ceylon and other favoured coffee growing countries”(12).

Clarson also writes of the good yields of sweet potatoes, Irish potatoes, maize, ‘Indian’ corn and in particular bananas and plantains, which could be of significant economic importance to the island in the future. Other resources of the island afforded potential export products according to Clarson and the anonymous 1880 author, and their assessment of these and general descriptions of flora and fauna provide details of the use of native resources:

“Fish are plentiful...are easily caught by line and hook, and large, delicately flavoured eels are in all the fresh water creeks”(Anon 1880:no pagination).

“With an increased and active population the curing of fish might become a valuable source of export trade...[also] the mutton-bird, a rare delicacy, and when properly preserved may become a favourite with colonial club epicures”(Anon 1880:no pagination).

“Some idea may be formed of the flocks of the dusky mutton-bird [Wedge-tailed shearwater] when it is mentioned that a party of five visited one island three days during this last season and obtained in a few hours 600 dozen of the eggs...the islanders make a point of clearing the nests every other day during this week in order to get perfectly fresh eggs. Certainly not a tithe of the eggs are obtained, as many of the islands are too difficult to scale, or altogether inaccessible”(Clarson 1882:8-9).

“The eggs are perfectly sweet, and not the slightest unpleasant flavour or odour can be detected. They answer just as well as duck’s or hen’s eggs for all purposes to which those are employed...from the enormous numbers of these eggs which yearly go to waste, it seems a pity that in these days of meat conserving no means can be adopted of securing and preserving them for export” (Clarson 1882:9).

“Few game birds visit...the only birds of value for the table being the beautiful green and gold dove, the wood-hen, the small curlew, called the snipe by the islanders, and a few waders or stilts resembling the sandpiper”(Clarson 1882:13).

Other uses of native resources mentioned include the seasonal collection of a crab particular to LHI which had a flavour that was ‘very delicate and agreeable’, the possibility turtle being ‘got in the season’, the extensive use of ‘Thatch’ palm for dwelling and fence construction and the abundance of fine grained timbers suitable for building and cabinet making (Clarson 1882). The abundance of the island’s produce, fine weather, the perceived

idyll of island life and the need to generate more income for the community led both authors to recognise the island's suitability as a tourist resort for the first time; the anonymous 1880 author felt LHI's possibilities to be superior to Madeira and other established health resorts, while Clarson (1882) enthusiastically wrote:

“The usual trammels and conventionalities of fashionable sea-side resorts would be here escaped, and visitors could roam its palm groves, climb its mountains, explore its botanical treasures, bathe in its waters, without a thought or care of the world they have torn themselves from. With a few roomy and cosy cottages erected on the island of the palm stems and thatched with their fronds, as is the custom, families might take occasional migrations from the colonies for a few months, arranging with a schooner or for a passing vessel to call at the island.” Pg 14

The limitation of the island's capabilities at this time curtailed any early attempts at tourist catering, although some opportunities were available: steamers en route to Fiji often came within sight of island and good boats and crew were available to meet passengers but the island lacked any accommodation for anything beyond two or three short staying guests (Clarson 1882). For the most part, despite the variety of possible new ventures, the island's economic activities were limited to onion production and occasional ship supply which was a far from ideal situation; the onions were beginning to be effected by smut and shipping was still limited. Armstrong's attempts to encourage other trades had moderate success, but the majority of these folded upon his dismissal, if not before; the export of palm fibre and guano both operated during Armstrong's four year tenure, but the eventual fate of these is not clear.

The presence of Armstrong and the upheaval caused by his dismissal saw a few different short term residents on the island. During Armstrong's tenure, he personally employed at least three workers from New Caledonia and five boys apprenticed to him from the government training ship the *Vernon* and their supervisor Robert Rose (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). The private guano collecting enterprise employed four Indian labourers and at least one supervisor, and where these additional workers were accommodated or how long they were resident on the island is not known. Rose was also nominated as a replacement school master following Thomas Wilson's retirement in 1880, but declined the post due to his association with the *Vernon* boys, and the community's objection to their presence (Lord Howe Island School 1979). Clarson was another short term occupant of the island, who was appointed in Rose's place as school teacher in January 1882, but his tenure was short lived as he was committed to

trial for bigamy in May 1882 (Lord Howe Island Central School 1979). A third replacement for the post of school master was found, William Stevens who with his wife and family came to the island in September 1882, and probably lived near the schoolhouse built earlier that year (see Figures 6.22 and 6.23: Lord Howe Island School 1979; Nicholls 1957). Other new arrivals to the island included two general layabouts and troublemakers, Frazer and Chapman who were on the island for a short time and at unknown locations (Nichols 2006).

Most established settlers remained where they were on the island, with a couple of exceptions: Campbell Stevens was appointed postmaster after Armstrong's dismissal, and it is likely that Campbell and his wife Alice moved from North Bay to Armstrong's old residence fairly soon after his departure, in order to take up Campbell's duties (Finch and Finch 1967; Nichols 2006; Nicholls 1952; Rabone 1940). The Mooney family still actually remained on the island, with the exception of Mr Mooney who was lost with the *Sylph*. Mrs Mooney and their two children had remained on the island, and when John Robbins arrived in 1880, Mary Mooney married and resettled with him to the south of the Moseley property, and north of the Big Creek catchment (Nichols 2006; Nicholls 1952; Rabone 1940). The state of likely abandoned occupations at Ned's Beach and North Bay are unknown, but the maintenance of these are a possibility, as is the continued gathering of resources at North Bay, even if the gardens and dwellings were completely abandoned.

Year/Map Symbol	Settler Group	Population
1882		
#	C. Williams	1
\$	King	1
%	Andrews/Nichols	9+
&	Moseley	2
*	Thompson/B	6
!	Field	1
x	W.Nichols	4+
w	Johnson	2
>	H.Wilson	1
"	T.B. Wilson	3
^	Stevens	2
~	Robbins	4
=	Rose?	2+
@	W.Stevens	4
o	Chapman	1
M	Frazer	1
Total		44+

Figure 6.22: Table of settlers on LHI and likely population as at December 1882

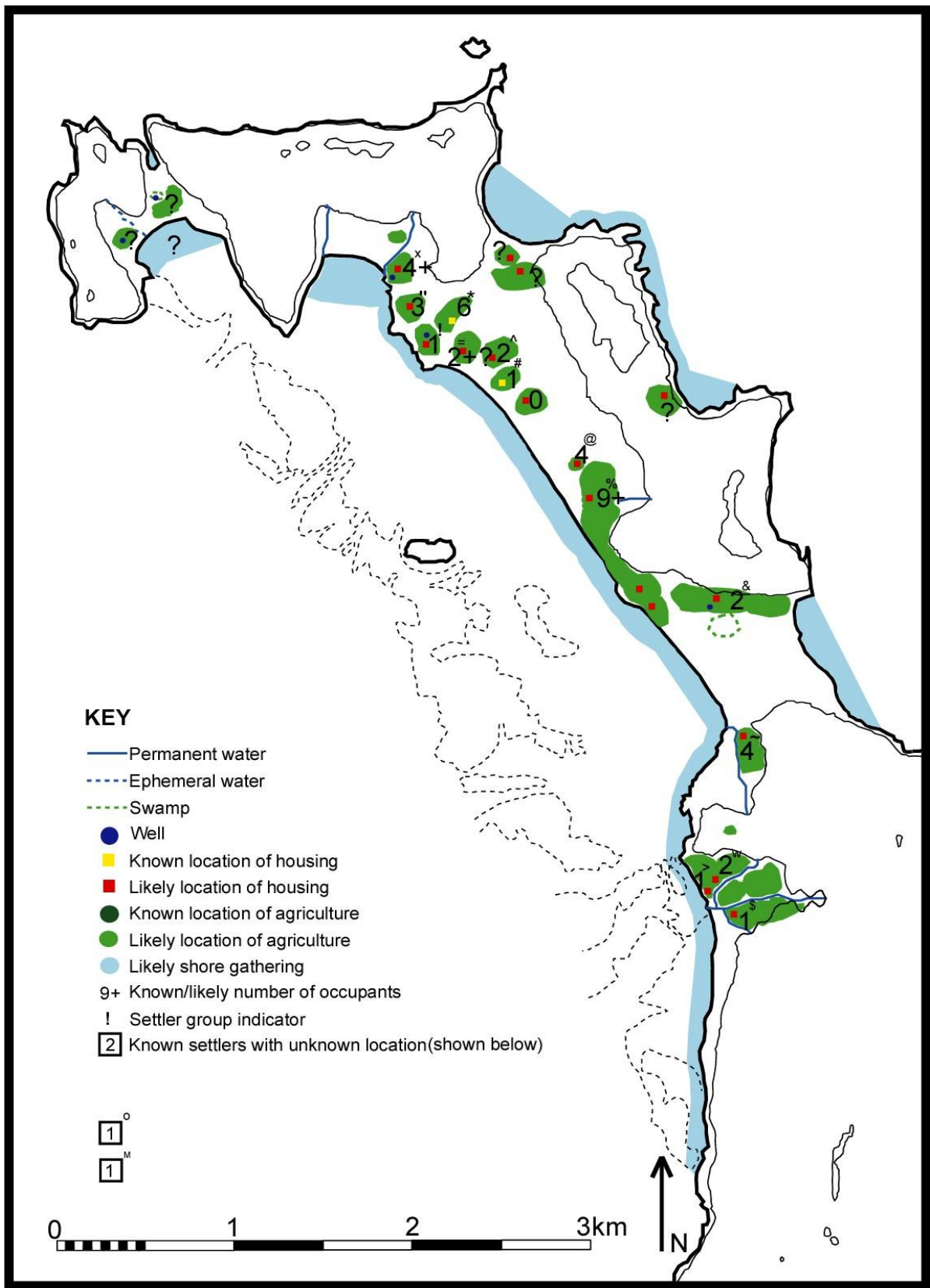


Figure 6.23: Map of settlement dwellings and gardens on LHI as at December 1882

Growing Maturity: 1891

Life on LHI continued much as it had following Armstrong's departure: a handful of exports and on island trade kept the economy afloat, new settlers periodically arrived, some left and the majority of established islanders continued on the land they had worked for years (see Figure 6.24). Short staying residents Rose, Frazer, Chapman and William Stevens and family all left the island in the early 1880s, while long term resident Charles Williams died in 1890 after nearly 50 years on the island (Finch and Finch 1967; Lord Howe Island Central School 1979; Nichols 2006; Nicholls 1952; Rabone 1940). New arrivals to the island were a mix of short staying families and single men, some of which stayed on and married second and third generation islanders.

The Tyrells arrived sometime prior to 1890, and worked for several island families, likely staying on their properties, before eventually moving to an area near the Thompson's and building their own residence (New South Wales Legislative Assembly 1890; Nicholls 1952). The Harland family also arrived sometime prior to 1890, and started building a house near the Field's place at Signal Point, while an unknown group of settlers under the name of Darthe also arrived prior to 1890 and settled at an unknown location (Lord Howe Island Central School 1979; New South Wales Legislative Assembly 1890; Nicholls 1952). Other new additions included W.E. Langley who arrived in 1895, settled in an unknown location and became the island's registrar of Births, Deaths and Marriages; Captain and Mrs Cavage who arrived in 1891 and likely took up residence adjacent to the school house, as Mrs Cavage was appointed school mistress in February 1891, while her husband was Forest Ranger and Special Constable; and Edmund Jeune and Celine Moore, who arrived in 1890 for the sake of Jeune's health and resided on a portion of the Johnson's land, with whom they had a tenancy arrangement in exchange for labour in the Johnson's gardens (Finch and Finch 1967; New South Wales Legislative Assembly 1890; Nichols 2006; Nicholls 1952; Rabone 1940).

Other possible settlers present at this time include William Retmock and P. Dignam who married single island girls and settled on the island: Retmock marrying the eldest daughter of Thomas and Mary Nichols, Mary and settling adjacent to the Nichols' extended property at Windy Point, and Dignam marrying Nathan and Bogue Thompson's daughter Emeline and probably settling on the site of C. Williams' old holding (Edgecombe 1987; McFadyen 1992). Other second (Thompson) and third (Nichols) generation islanders were well into adulthood, and it is likely that George Nichols and William Thompson had both

left their parental homes and built their own residences by this time, on land adjacent to their respective parents holdings (Edgecombe 1987; McFadyen 1992; Nichols 2006; Nicholls 1952)

Trade and the economic state of the island continued to limp along due to the lack of reliable shipping, but enough opportunities rose to allow the slow but steady growth of the palm seed industry and the continuation of the profitable onion trade. However, a source writing two years later indicates that the onion trade was almost exhausted, due to continuing problems with the crop and shipping, which also dampened the success of other export crops:

“Hitherto exports have been mainly confined to onions, maize, sweet potatoes, bananas, oranges, lemons, palm seeds, and poultry; and undoubtedly the most lucrative export so far has been onions...So superior are the Lord Howe onions to all others placed upon the markets that picklers willingly pay for them three times the price of the common garden or field bulb of commerce. The record price yet realised, as far as can be ascertained with certainty, was £25 per ton in Sydney and £30 per ton in New Caledonia; and the greatest quantity exported from Lord Howe to Australia and New Caledonia reached 35 tons one year”(TDE 1893b:no pagination).

“But just now this prestige in on the wane, as of late the onion crops have been blighted almost out of existence by the attacks of minute fungi, not unlike smut in wheat. Several remedies tried so far have been used in vain...The ravages of the disease naturally caused a diminution in production, and, as may be surmised, a corresponding depreciation in the selling values of the article, the highest price obtained of late not having exceeded £5 per ton”(TDE 1893b:no pagination).

Despite the increased steamer traffic in the area servicing Norfolk Island and other Pacific islands such as Fiji and New Caledonia, LHI struggled to attract a regular run, which appears to be due in part to the relatively small custom offered by the island and possibly a lack of sufficient industry on the part of the islanders:

“One of the many grievances dinned into the ears of visitors is that the island trade is ‘cribbed, cabined, and confined’ by the absence of regular and more frequent communication with the outer markets, and, to support their plea, growers assert that quite recently crops have been garnered and packed, and then left rotting in the granaries owing to the non-appearance of vessels at the island”(TDE 1893b:no pagination).

“Lord Howe people seem to think that steamers are never in a hurry...that time is of no object. You cannot get them alongside until after breakfast, and then they regard their exertions in the light of conferring a favour. A light lighter would be of immense service there, saving a lot of time and handling of produce. More energy

is required at Lord Howe, and if the people will only move, the steamers will gladly respond”(Unnamed steamer captain in TDE 1893b:no pagination).

This lack of reliable shipping meant that the community continued to be vulnerable to staple shortages on the island: on arrival the 1893 author found that the islanders were completely out of flour, sugar, tea and tobacco as a consequence of the last supply schooner expected at the island, the *Mary Ogilvie* wrecking at Norfolk Island three months prior (TDE 1893a). The islanders appear to have been self sufficient in most other things, as they continued to run cattle for dairy, kept and hunted pigs for pork, farmed poultry for eggs and meat and grew a selection of other fruit and vegetables with maize, sweet potato, onions, lemons, oranges, pineapples and bananas going particularly well. Coffee continued to do exceptionally well, but it seems the islanders only used it for domestic consumption, and arrowroot, another crop that thrived, was generally wasted as an economic mechanised way of processing it was not available (TDE 1893 a and b). The presence of approximately 100 head of sheep in 1893 is also mentioned, but whether these animals were grazed for wool, consumption or both is not known, nor whether attempts were made to export sheep products to the mainland markets and/or elsewhere (TDE 1893b).

With the exception of the abundance of fish, very little mention is made of any native animal or plant resources utilised on the island in 1893, although it is likely that some forms of gathering persisted, particularly with regards to mutton birds, sooty terns, and the Emerald ground-dove as indicated by later sources (Hutton 1990). House styles were slowly changing from the traditional full thatch dwelling described by earlier sources, but still utilised some native materials:

“Lord Howe Island houses are substantially built of wood, and serviceably if not sumptuously furnished. One or two cottages of the bungalow order present a distinctly tropical appearance. With walls of weatherboard and thick roofs of palm thatch they stand in clearings of the bush surrounded by well-kept gardens, brilliant in colour from tropical flowers and foliage”(TDE 1893b:no pagination).

Other aspects of daily life appear little changed from that described by sources from the previous decade: the island was furnished with a school, a forest ranger, a registrar of births, deaths, and marriages and a postmaster and in the place of a resident magistrate, a visiting magistrate and special constables to mediate different matters in the magistrates absence. The general health of islanders continued to be excellent despite the lack of a Dr or communal medicine chest and islanders were exceptionally long lived, with several 1893 citizens being over 85 and another five over 70 (TDE 1893b). Apart from their stymied

trade efforts, a new issue of contention was facing islanders as a result of their good health, general success, natural population growth and continued emigration:

“The settlers are merely Crown tenants upon sufferance, having no possessory right or title to the land they till...So long as the islanders continue to consent to peaceably conform to the laws of New South Wales there is no desire to interfere with the insular arrangements on the part of the authorities in Sydney...But occasions have arisen when interference firm and just would have saved much ill-feeling on the island”(TDE 1893b:no pagination).

“In 1883 disputes occurred relative to the alleged ownership of land, and it was...urged that regulations be enforced to give the people a reasonable security of tenure and sufficient land for their requirements...from then till now the land affairs of the island have remained on the old unsatisfactory basis”(TDE 1893b:no pagination).

“A newcomer is regarded as an aggressor on the rights and privileges of settlers already there, and amongst old settlers one family looks with great disfavour upon his neighbour who may happen to get temporary possession of a piece of land the other covets”(TDE 1893b:no pagination).

Land tenure and occupancy issues was a continuing issue for the LHI community until 1953, and the first indications of it in 1890s signify the maturation of the settlement, as it approached its sustainable carrying capacity as a subsistence farming economy.

Year/Map Symbol	Settler Group	Population
1891		
&	Moseley	2
%	Andrews/Nichols	8+
!	Field	1
*	Thompson/B	3+
^	Stevens	2
w	Johnson	2
\$	King	2?
x	W. Nichols	8
~	Robbins	4
>	H.Wilson	1
"	T.B. Wilson	6+
s	Harland	12
@	Cavage	2+
Y	Juene/Moore	4
=	Tyrell	2+
N	G.Nichols	2+
E	Retmock?	2+
#	Dignam?	2+
z	W.Thompson?	2+
o	Darthe	1
M	Langley	1
Total		69+

Figure 6.24: Table of settlers on LHI and likely population as at December 1891

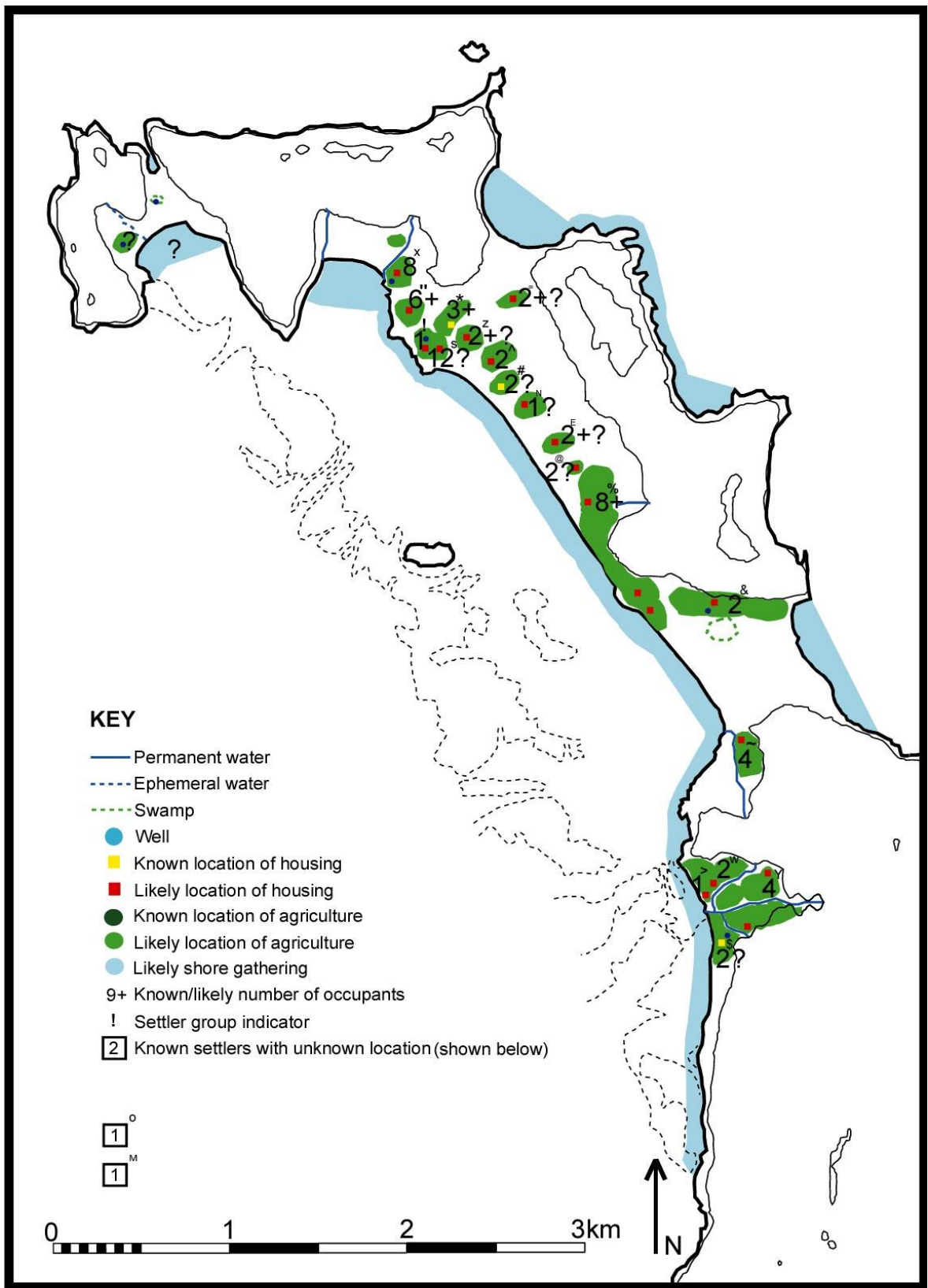


Figure 6.25: Map of settlement dwellings and gardens on LHI as at December 1891

End of Isolation and New Economic Frontiers: 1900

The turn of the century on LHI also saw the gradual turn of the island economy and society from a largely agricultural subsistence and opportunistic trade to a more organised and reliable export of palm seed. Islanders still produced most of their daily needs from their livestock and crops, but the majority of their economic efforts were turned towards the growing palm seed trade which was occasionally supplemented by handfuls of visitors brought by the mail steamers. The establishment of a regular steamer service to the island at the end of 1893 by Burns Philp and Co marked the end of the island's largely isolated existence, and fostered the growth of the palm seed trade. The needs of the seed trade began to take precedence in the use of resources on the island, and influenced changes in construction, subsistence and animal husbandry strategies:

“[*Howea forsteriana*]...used for thatching purposes; the stems, cut to four, were at one time largely used for battens, but now they are rarely put to such use as the trees are too valuable as seed yielders”(Maiden 1898:138).

“Heart of Palm-tree [*Howea*] was boiled as a vegetable in former times. It tastes like a cabbage stump. They more strictly conserve the palms now”(Maiden 1898:155).

“These animals largely feed on Palm seeds and on the tubers of *Elatostemma*. The islanders now keep the pigs in styes, as their destructiveness to the vegetation in the past is now well known to them”(Maiden 1898:115).

Other aspects of daily life were likely to have remained the same for some time, and Maiden (1898) gives a particularly detailed record of the crops growing and previously tried, native plants and some of their uses and introduced weed species which were either currently utilised or had been in the past (but unfortunately some species identifications are a little problematic due to the redescription and reclassification of native LHI and other species since 1898). The list of crop species was particularly long, and included a wide variety of tropical, sub tropical and temperate species from Asia, America, Europe and the Pacific (see Figure 6.26: Maiden 1898:152-154). The uses of native plants range from several species that are particularly favoured for fire wood, construction, thatching, fencing and cabinet making to those used for more specific tasks such as boat building and fishing lines. Several are noted only for the fact that livestock eat them, particularly cattle, and two species are named directly as a source of human food, one of which was specifically cultivated for a time by the islanders (see Figure 6.27: Maiden 1898:123-143). The list of

Fruit		Vegetables	Other Crops	Fodder/Grain
apple - cooking	mandarin	cabbage	bird's eye pepper	dandelion
apple - eating	mulberry	cauliflower	blue aloe	lucerne
apricots	orange	choko	candle nut	maize
banana - cavendish	papaw	Indian shot arrowroot	castor oil plant	sorghum
banana - plantain	passionfruit	onion - pickling	chilli	teosinte
banana - sugar	peach	onions - large	coffee – 2 varieties	
black guava	peanut	potato arrowroot	sugar cane	
cape gooseberry	pear – cooking	sweet potato	tobacco	
cherimoya	pineapple	yam	white mulberry - silk worms	
citron	plum			
date palm	pomegranate	Used to be Grown	Failed Experiments	
grape - muscatel	quince	ginger	tea	
grape -black Hamburg	strawberry	mountain taro	fibre banana or Manilla hemp	
lemon	turkey fig	onion arrowroot	cotton	
lime	yellow guava			
loquat				

Figure 6.26: List of crops grown and tried on LHI by 1898

Common Island Name	Scientific Name	Use
Kurrajong	<i>Hibiscus tiliaceus</i>	Bark fibre used to make fishing line
Sallywood	<i>Lagunaria patersonia</i>	Cattle eat leaves Source of grubs for fishing
Box or Yellowwood	<i>Sacromelicope simplicifolia</i> or <i>Zanthoxylum pinnata</i>	Fence posts General building
Scalybark	<i>Syzigium fullagarii</i>	Generally used for pit sawn timber
Wild Celery	<i>Apium prostratum</i>	Once cultivated and produced an 'inferior celery'
Green Plum	<i>Atractocarpus stipularis</i>	Fence posts Fire wood
Stinkwood	<i>Coprosoma putida</i>	Cattle eat leaves
Fitzgeraldii	<i>Dracophyllum fitzgeraldii</i>	Fire wood
Maulwood	<i>Olea paniculata</i>	Fence posts Fire wood 'All purposes'
Boarwood	<i>Geniostoma petiolosum</i>	Cattle eat leaves
Juniper	<i>Myoporum insulare</i>	Boat building Highly favoured fire wood
Blackbutt	<i>Cryptocarya triplinervis</i>	Highly favoured fire wood
Banyan	<i>Ficus columnaris</i>	Cattle eat leaves - good cream yielder
Tent tree or Forky tree	<i>Pandanus forsteri</i>	Seeds eaten - called 'almonds'
Thatch Palm	<i>Howea forsteriana</i>	Leaves used for thatching Trunks used for construction Cattle eat leaf ends Seeds used as pig fodder

Figure 6.27: List of native plant species and their common uses on LHI in 1898

introduced weeds on the island is quite long, but includes a couple species with some economic use: Purslane or *Portulaca oleracea* was used as pig fodder and a cabbage substitute, *Mendicago denticulata* as a general fodder and *Solanum nigrum* or 'Black Currant' fruits were used occasionally for jam (Maiden 1898:149-150). Other vegetable alternatives used on the island in the past included taro and sweet potato leaves as a cabbage substitute, and the boiling of green bananas as a potato substitute (Maiden 1898).

In general it appears that agricultural practices remained much as they were, with plantings being surrounded by buffers of vegetation to protect against the oceanic winds and salt spray, and Maiden lists a number of species trialled as wind breaks but it was found that introduced oleander (*Nerium oleander*) was the most effective. Despite the fairly judicious maintenance and/or planting of windbreaks, previously abandoned clearances were beginning to impact the surrounding forest regime:

“As regards wind-breaks, the average Australian settler begins by cutting down as much vegetation as he can. This was the policy of the early settlers in Lord Howe Island or at all events the clearings they made were often injudiciously chosen. In consequence the wind yearly makes sad havoc with the openings already made, and further trees crash down during every storm”(Maiden 1898:114).

The impact this attrition of forest cover would have had on the island is not clear at this time, but generally would have served to reduce the amount of suitable habitat available for land snails and other invertebrates, birds and other land species such as the small lizards and bats. Actual targeted use of native fauna appears to have been limited to sea birds, as Maiden only talks briefly of their use in the appropriate season:

“Mutton-birds and their eggs are largely used for food in the proper season, so also are the eggs of the Wide-a-wake [Sooty Terns] and Gannet [Masked Booby]. Mutton-bird fat is used by some for cooking, but it has a fishy taste”(Maiden 1898:155).

The reliance on hunting introduced game also appears to have been on the wane, with islanders keeping pigs in sties for domestic use to curb vegetation destruction and a lack of available animals:

“We saw no wild pigs although we were informed that there are still a few on the tops of Mt Lidgebird and Mt Gower. The same remark applies to the goats, a few of which are also to be found on goat or Rabbit Island”(Maiden 1898:115).

The only other change to the use of livestock on the island was the use of horses to draw iron shod sleighs, which served as the only vehicles on the island and travelled along the one road along the lagoon coast. This method of travel appears to have been the principal use horses were put to at this time, with most farm draught work being done by bullocks.

The turn of the century also saw the continued turn over of successive generations. Margaret Andrews, Nathan and Bogue Thompson, Mary Field, W. Langley and Alan Moseley all passed away in the nine years between 1891 and 1900, leaving their respective offspring and Mrs Moseley to continue on at their properties (see Figures 6.28 and 6.29:

Edgecombe 1987; Finch and Finch 1967; McFadyen 1992; Nichols 2006; Nicholls 1952; Rabone 1940) . The fate of the Field’s property is unknown, as they had no children, but it is likely that it was taken over either by one of the Thompson family, one of the T. Wilson’s children or W. Nichols’ children. Similarly, Langley’s property did not pass to anyone in particular, but given the growing demand for land and the increasing numbers of island children marrying and seeking to settle apart from their family make it likely that his holdings would have been occupied rather than abandoned. Harland, Cavage, Darthe, Juene/Moore and Tyrell all left the island, and the fate of their respective holdings is again unknown, but are likely to have been occupied by successive settlers or adult island children. Henry Wilson, who resided in his own dwelling somewhere on the Johnson’s property was forced to leave the island after his hut was burnt down around 1895. New arrivals Hector Innes and George Kirby came to the island in 1895 and 1900 respectively; Innes married Grace Nichols, daughter of Mary and Thomas Nichols, and settled on the old Lucas property which had been transferred to Margaret Andrews (Grace’s grandmother) in the 1870s, while Kirby possibly resided at the old teacher’s residence adjacent to the schoolhouse, where he was later employed as school teacher. The first year of the 20th century was a period of that not only saw the continuation of many old ways of life and the succession of generations, but also the beginning of bigger change to trade, subsistence and society which saw the end of LHI’s marked social, economic and geographic isolation and its greater inclusion in the affairs of New South Wales, Australia and the World.

Year/Map Symbol	Settler Group	Population
1900		
&	Moseley	1
%	Nichols	6
*	J.Thompson	1
^	Stevens	2
w	Johnson	2
\$	King	6
x	W.Nichols	8
~	Robbins	3
"	T.B. Wilson	8
N	G.Nichols	2+
E	Retmock	3
#	Dignam	2+
z	W.Thompson	5+
!	Innes	4
@	Kirby	1
Total		54+

Figure 6.28: Table of settlers on LHI and likely population as at December 1900

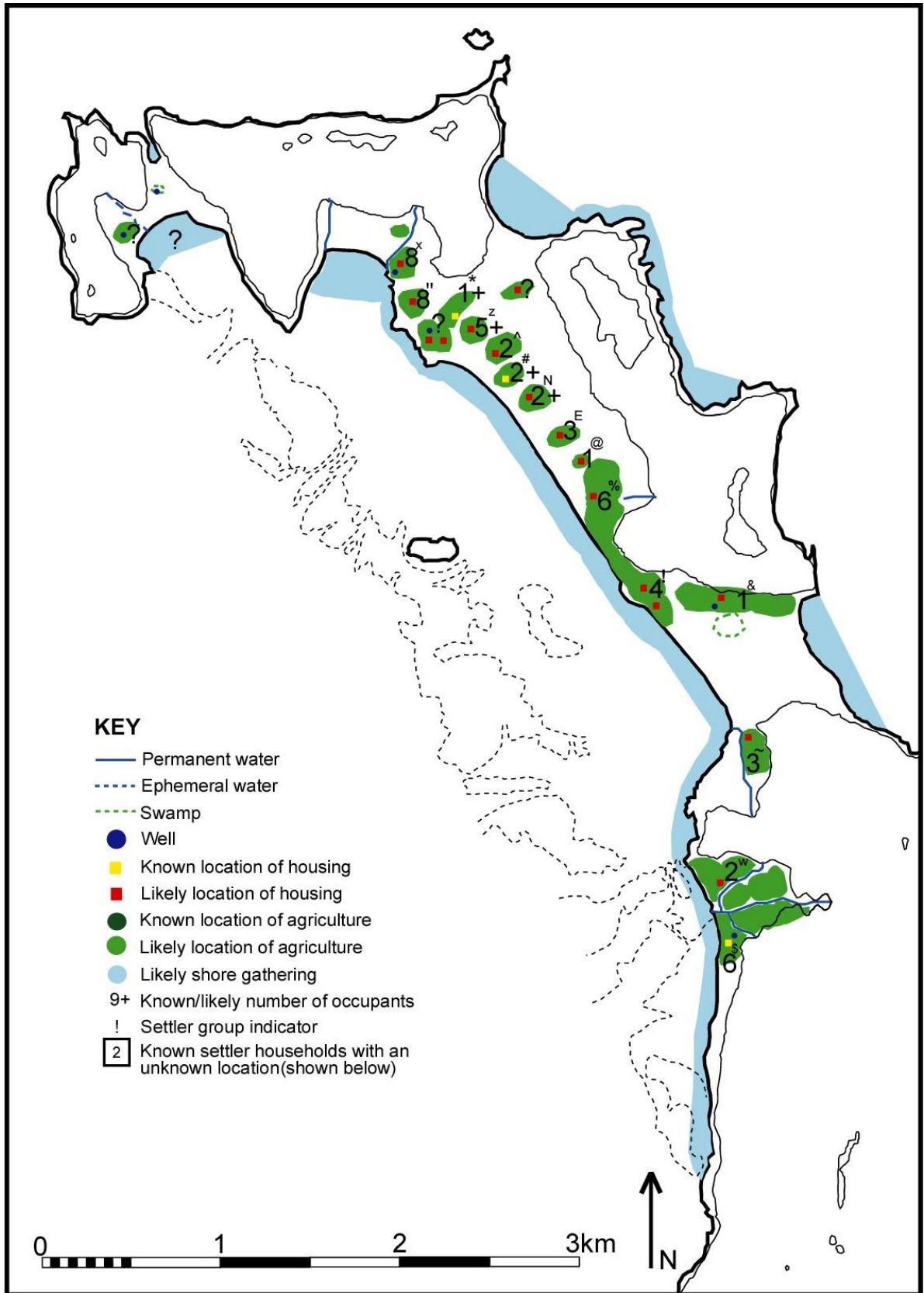


Figure 6.29: Map of settlement dwellings and gardens on LHI as at December 1900

Rats and 20th Century Resource Exploitation: pre 1980 bird distribution

The exploitation of island resources have continued in some form throughout the 20th century, but the minute detail of these and the continued arrival and locations of successive settlers become hard to pinpoint, due to the increased pace of settlement, increased avenues of arrival and forms of livelihood and the lack of minute accounts of more recent history. Although it is apparent that human reliance on native resources was greatly reduced by the turn of the century, the most significant environmental disaster for the island was yet to come. Following the grounding of the *Makambo* in 1918 and the subsequent rat infestation, five species of land bird became extinct within 10 years; the Vinous-tinted Blackbird (*Turdus xanthropus vinitinctus*), Lord Howe Fantail (*Rhipidura cervina*), Lord Howe Gerygone (*Gerygone insularis*), Lord Howe Starling (*Aplonis fuscus hullianus*) and the Robust White-eye (*Zosterops strenua*) (Hutton 1990). Another species vanished 40 years later as an indirect result of the rat presence, the Lord Howe Boobook owl (*Ninox novaeseelandiae albaria*) disappearing as a likely result of the introduction of larger owl species in the 1920s in an effort to control the rats (Hutton 1990). The disappearance of these largely insectivorous birds saw the phenomenal increase of insects, which in turn wrecked havoc amongst the islander's remaining crops and palm seeds.

The rat's impact on the island's invertebrates is largely unknown, but they were the definite cause of the disappearance of the once numerous LHI Phasmid (*Dryococelus australis*) from the main island within 20 years of the rat's arrival (Environment Australia 2002). Rats also were a major contributor to the apparent extinction of two subspecies of *Placostylus bivaricosus* (*cuniculinsulae* and *etheridgei*), and the severe endangerment of the third subspecies still present on the island *Placostylus bivaricosus bivaricosus*, which was once wide spread and abundant across the lowlands and foothills and now only occurs in three relict sub populations, which still face significant predation from rats (New South Wales National Parks and Wildlife Service 2000). A similar scenario is likely for the reduction of the other large land snail species present *Gudeoconcha sophiae*, but conversely rats have also restricted the spread of the introduced European garden snail *Helix aspersa* (Recher and Clark 1974a). Given the impact of rats on the land snails and phasmid, it is likely they have had negative impacts on other invertebrates which have not been identified. Rat predation on eggs, in conjunction with habitat loss is also a likely factor in the decline of the two species of lizard on the island, the LHI Gecko (*Christinus guentheri*) and the LHI Skink (*Pseudemoia lichenigera*; Recher and Clark 1974a). In view of the

impact of rats on numerous land birds it is probable that they also had some effect on nesting sea birds on the island, but given that seabirds in general are larger in body and egg size than those of the land birds destroyed by rats, and the seabirds ability to move to the offshore islands, any impact is likely to have been minimal. Continued human predation on seabirds and habitat loss are more significant factors in the survival of certain species on the island, and general sources indicate that the gathering of some sea birds persisted as an important subsistence strategy throughout the first half of the 20th century:

“It was a regular activity early in September to visit the [Sooty] Tern colonies on Roach Island to collect buckets of eggs. Even the school children took part and it was considered a regular holiday outing for them. Older Islanders can still recall visiting the Admiralty Islets with empty four gallon (20 litre) kerosene tins, and neatly stacking the Tern eggs in the tins between layers of grass. Each tin held eight to 10 dozen eggs and a day’s collecting could yield up to 20 tins”(Hutton 1990:56).

The majority of tern eggs collected were preserved in layers of salt, allowing them to be kept up to six weeks, during which time the eggs were put to multiple uses:

“These eggs form an agreeable addition to the food supply, and are cooked in various ways, the principal being plain hard-boiled, eaten cold, or made into large omelettes....They have practically no fishy flavour, and are not so rich as the domestic hen’s eggs....The industry of collecting these eggs for food has resulted in the evolution of a local term viz., ‘Wideawakeneggin’”(Basset Hull 1909 in Hutton 1990:56-57).

Mutton birds were also harvested well into the 20th century, although it seems that they were mostly sought for their eggs, which were collected from the extensive colonies which persisted on the eastern coast of the main island. Despite the continued use of mutton birds and terns throughout most of LHI settlement, the populations were robust enough and the islander’s use apparently sustainable to allow both the birds to remain in considerable numbers to the present day. The total impact of human and animal predation over the course of nearly 150 years settlement on the island was still significant, and is particularly noticeable in the spread of birds on the island in the latter half of the 20th century, prior to the success of concentrated conservation programs from the 1980s onwards (see Figure 6.30).

Success in the Age of Conservation: present day bird map

The reliance on seabirds, other native food sources and subsistence farming increasingly diminished with the success of the palm seed trade, the later influence of

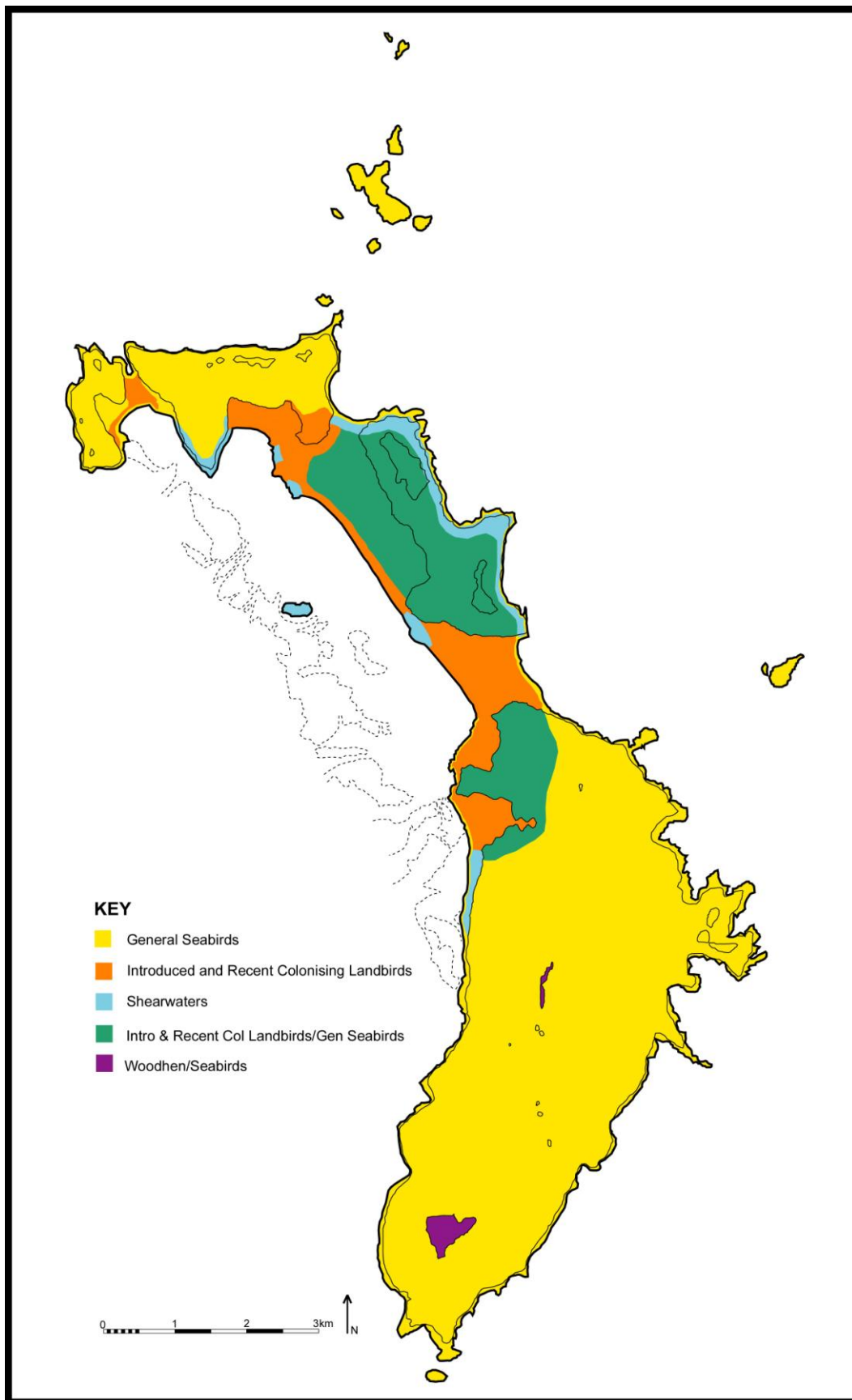


Figure 6.30: Pre 1980 map showing the likely distribution of significant prey birds and recent colonisers/introductions

tourism and the increased reliability of shipping and mainland supplies. The eventual realisation of frequent, reliable communication with the rest of the world coincided with the advent of more environmental awareness and the introduction of conservation programs following increased recognition of the island's unique geological and ecological value. Such conservation regimes included the concentrated hunting of the remaining pigs and goats in order to prevent any further environmental damage, allow the regeneration of damaged habitats and stop pig predations on certain bird species (Hutton 1990). The cultivation and introduction of plant species, the clearance of land, the running of livestock and keeping of household pets also came under the purview of environmental management, and such changes to the availability of game, crops, livestock and land would have severely impacted the island community if it hadn't already shifted away from a subsistence economy.

General animal control measures have been varied and generally successful: trapping of feral cats and restrictions on the keeping of domestic cats were introduced to prevent predation on land and sea birds, and the running of domestic fowl was restricted to coops to reduce foraging impacts on leaf litter and native invertebrates (Hutton 1990; Recher and Clark 1974a and b; Thompson 2004). Following the lapse of the rat bounties in the 1930s, rat control has largely consisted of poison baits of different formulations, which have had mixed success. The rats remain the most significant ecological threat on the island, but current poison formulations are proving resistance free at the moment and serve to keep the population at a reduced level (Hutton 1990; Hutton 1998; Thompson 2004). Interestingly, some bait formulations have in the past facilitated an increase in the mouse population, but since the decline of agriculture mice are largely a mild household pest which generally only occur in the settlement area (Recher and Clark 1974a and b). The remnants of several species of owl which were introduced as a form of rat control in the 1920s also caused some problems, particularly the Masked Owl (*Tyto novaehollandiae*) which preys on seabirds, woodhens, and was a likely competitor of the native LHI Boobook Owl, leading to its extinction in the 1950s (Hutton 1990; Recher and Clark 1974a). In the late 1980s a shooting program was undertaken to control the owls which bagged 35 birds, but the species still persists on the island and continues to prey on selected species (Hutton 1990).

The major uses of island flora have largely disappeared with the availability of modern construction and fencing materials, and general availability of electricity after

WWII. Grazing and crop growing, the main vegetation disturbances aside from pigs and goats, were allowed to continue much as it had in existing clearances, with the provision that paddocks were properly fenced and recognised and potential weed species were not cultivated or introduced to the island. Weed control programs continue to identify and remove areas of weed infestation in forested areas, and the rehabilitation of certain areas, particularly exposed coastlines, seabird nesting areas and woodhen habitats have been largely successful. Since 1980, some seabird colonies have recovered territory on the main island, while a few species that had previously been restricted to the offshore islets are beginning to recolonise areas of the main island (see Figure 6.31; Hutton 1990; Hutton 1998; Hutton 2004).

The most significant recovery of species on the island is that of the Woodhen, which has been re-established in most of its previous range as a result of a successful captive breeding and release program in the early 1980s. Surveys done specifically on the bird in the 1970s found very small remnant populations existing on the plateau summit of Mt Gower and on the upper slopes of Mt Lidgbird, with only 16 birds being caught and banded (Hutton 1990). Rat, pig, owl and cat predation, browsing competition from pigs and habitat destruction by pigs and goats were found to be significant factors preventing the natural revival of the woodhen, and the proposed recovery program served as a catalyst for pig, goat, owl, and cat eradication programs (Hutton 1990; Recher and Clark 1974a). Following the successful capture of three breeding pairs and the rearing of 92, woodhens were released in selected areas of the island, and their population has been monitored ever since (Hutton 1990). Being a territorial bird, the population appears to have successfully reached its upper population limit within a few years of release, due to the reduced availability of suitable territories and these levels continue to be maintained from year to year to the present day (Hutton 1990; Hutton 1998; Hutton 2004; Thompson 2004).

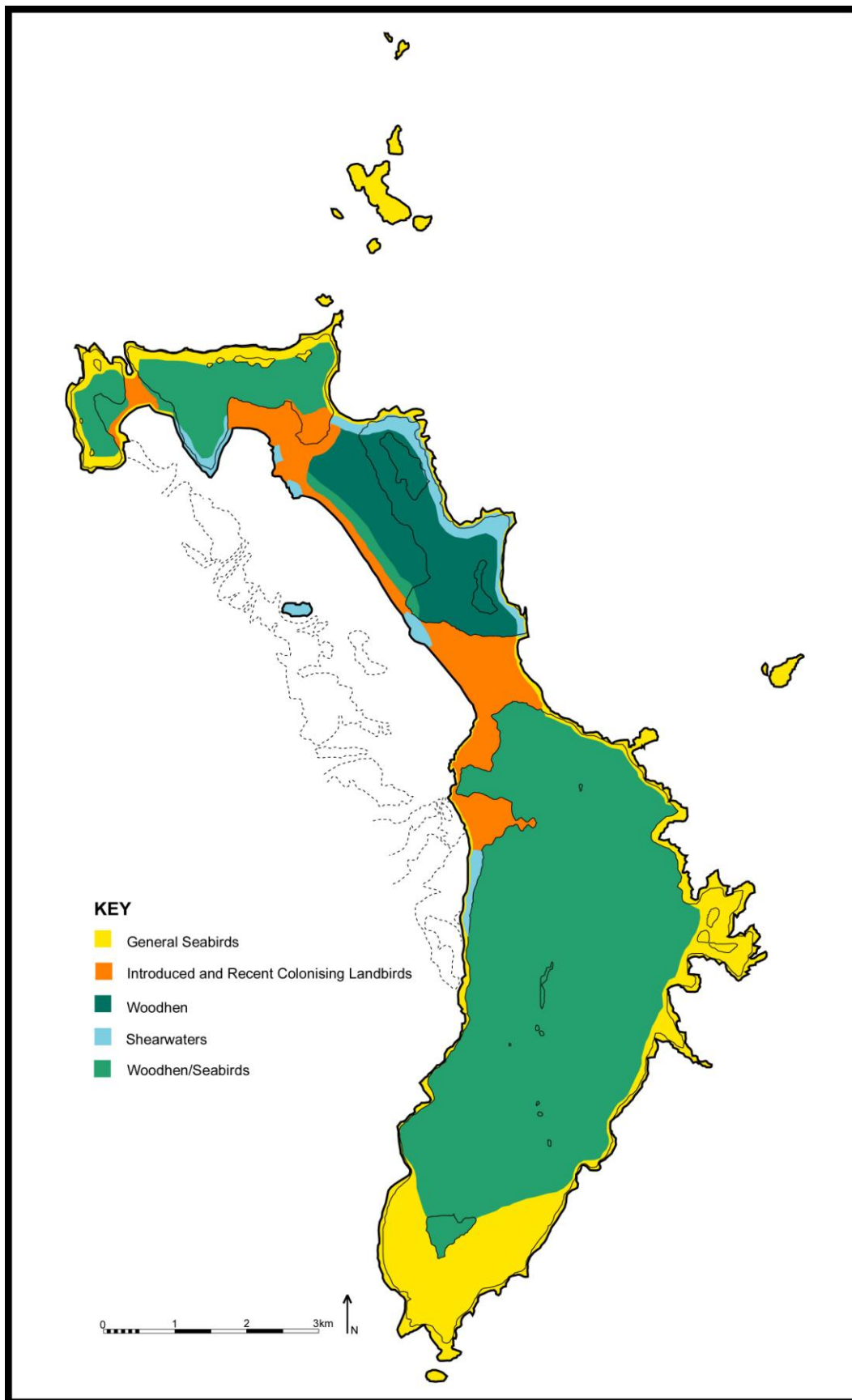


Figure 6.31: Present day map showing the likely distribution of significant prey birds and recent colonisers/introductions

Chapter Seven

“...this once much frequented and favoured little spot”: Conclusion

The Late Arrival: the colonisation of LHI

Being one of the last islands in the Pacific to be occupied by humans, the processes and consequences of LHI's settlement fall within many of the patterns identified in previous examples of island colonisation, while at the same time are strongly defined by LHI's particular historic context. The particular temporal and cultural location of LHI's colonisers certainly influenced the ways in which they created their settlement landscape, however most of their primary needs were much the same as any new arrival in trying to survive in a foreign, empty land. The progression of changing economic imperatives (both on the island and the influence outside sources) can be traced in the history and archaeology of LHI, and is both instructive in understanding other island colonisations due to both the similar and unique characteristics of LHI's colonisation.

Settlement Locations

The first people on LHI located their settlement in the most obviously favourable location on the island to suit their direct needs. Hunter Bay and its close environs had many positive attributes for not only their immediate survival, but for their trade aspirations with passing vessels. A sheltered bay with easy beach access, clear visibility across the lagoon to the biggest reef passage and close access to the only lookout points (apart from the Mt Gower or Lidgbird summits) affording almost 360° views across the island and ocean, Hunter Bay also held the second biggest source of permanent water on the island and was stocked full of 'larder' species. Bird species available across the island such as gallinule, woodhen and pigeon would have been particularly plentiful in the well watered bay, in addition to nesting rookeries of muttonbirds, (probably) Tasman Boobies and other sea birds along the sandy foreshore. The tidal flats would have provided good gathering opportunities for molluscs, crabs and urchins and provided easy access for shore fishing and boat launching for deeper water access and ship trade. Further, the bay was also within close range of other resource rich areas, particularly Ned's Beach and Signal Point. Large sea bird colonies, rocky shoreline gathering and fishing would have been available at both

locations, and Ned's Beach provided an alternative landing site on the opposite side of the island if conditions required it. Building materials (as found in the OSBF dwelling) in the form of palms, mud, basalt boulders and calcarenite outcrops were all available in Hunter Bay, and in addition to the palm forest on the bay flat, the lower slopes would have afforded other species suitable for firewood and construction. The obvious means to fulfil the immediate need for water, food, shelter and fuel would have made Hunter Bay a standout choice for settlement, especially before the colonists were sufficiently settled to undertake substantial agriculture.

The location of a garden some distance from Hunter Bay six months after settlement suggests that the first areas possibly tried in Hunter Bay were not the best for agriculture, as it is likely that much of the bay flat was too sandy and porous. Any difficulty this may have caused was obviously not sufficient to prompt abandonment of Hunter Bay and its attractions, and this is a possible indication of the inclination of the first settlers to subsist on native foods rather than rely solely on grown produce and domestic animals. It is unclear how much the cultural background and recent experience of the colonists influenced these choices, but it is likely that the Maoris would have been very familiar with such foods, while the British whalers had spent sufficient time in New Zealand within native settlements to be equally content with the wild foods on offer on LHI. Further, the economic opportunity that prompted their settlement would have influenced the amount of reliance they had on agriculture for the day to day subsistence; it is probable that most produce from their gardens during early settlement would have been destined for the ship trade. Once they became more established it is likely that further trials of gardens in Hunter Bay were successful and would have added to the bay's attractions as the main settlement location on the island.

With the eventual arrival of the next two settler groups, the next best locations outside the immediate resource catchment of Hunter Bay were occupied. The Middletons at North Bay and Charles Williams at the northern end of Lagoon Beach were both able to access a wide range of resources outside those that were likely to have been the most heavily utilised by ABC in Hunter Bay, while still being as close as possible to the established locale of activity. This proximity would have been important both as a means of being able to build and access a community support network, while also being in close proximity to the established locales utilised by the ship trade. North Bay provided another sheltered location with permanent water available from an easily dug well; easy beach

access to varied marine gathering in the lagoon on one side and the rocky north coast on the other; access to a variety of nesting seabird colonies, gallinules, pigeons and woodhens; calcarenite, basalt boulders, palm and other timber for building and fuel; and close access to excellent lookout posts. Charles Williams' location on Lagoon Beach would have allowed him easy access to the resources of Ned's Beach, Lagoon Beach and Signal Point. Although the Lagoon Beach front would have been more exposed, any buildings and gardens would have been sufficiently sheltered by palm forest while also providing access to numerous birds.

When ABC were bought out by Poole and Dawson, and they brought in successive groups of workers, the established locale of Hunter Bay was maintained as the focus of activity, while the most next advantageous catchment at Big Creek was settled fairly soon after by their employees. Not only was Big Creek well watered and its native resources probably largely untouched, it provided a greater opportunity for larger volume agriculture due to the availability of richer soils from mountain runoff. The negative aspects of the position, such as the lack of sheltered water and lookout availability were overcome by the fact that the Big Creek settlement was one part of a growing settlement network that could provide for such needs at other locations on the island. Similarly, other locations that were subsequently settled by members of the partnership were able to offer a range of positive aspects, while any drawbacks could be compensated by the resources of other settlement areas. Each successive settlement was situated to take advantage of as many resources as possible while maintaining a fairly even distance between locales of occupation, maintaining a 'buffer zone' around each household. This served not only to ensure the retention of forest cover for windbreaks, but also mediated the reliance of settlers on the same sources of water, fuel and game. Even with the eventual dissolution of all business partnerships on the island, the established settlement network and community spirit of co-operation enabled the occupants who remained to maintain their spread out settlements, and encouraged the pattern 'filling in the gaps' to continue with subsequent arrivals.

With the eventual increase in the agricultural sophistication of the settlers, the features looked for in potential new occupation sites would have shifted more towards the availability of suitable soil, water and shelter rather than immediate access to native food resources. The general pattern of spaced out settlement continued, and certainly native resources would have continued to have value, however the likelihood of some attrition of these resources would also have influenced subsequent location choices. Equally the

decline and eventual cessation of significant ship trade would have influenced not only the volume of agricultural activity undertaken, but also the amount of land kept between successive occupations. From the time of significant attrition of most agricultural activities, more concentrated locales of occupation started to develop: in the Big Creek catchment, between Signal Point and Ned's Beach and around Windy Point. This was due mostly to the succession of generations settling adjacent to or on the outer portions of their parents 'lands'; the settlers acquired ability to identify locales able to support several subsistence farming households; and a lessened reliance native resources and the need to share equal access to them.

Towards the turn of the 20th century, the LHI settlement reached the upper limit of the island's carrying capacity for both subsistence farming and small cash cropping, particularly in light of the islanders need to preserve the remaining palm forest for the collection of seeds. The eventual advent and growth of tourism throughout the 20th century served to shift the types of attributes required in an occupation site; reliance on 'kitchen gardening' and dairying waned with reliable transport from the mainland, and allowed a certain increase in the establishment of households on previously farmed land. Increasingly, island locations that had a view and were close to recreation areas and community facilities gained in importance, further encouraging settlement clusters which are reflected in the present landscape of LHI. The majority of the community is concentrated between Signal and Windy Point, with remnant agricultural activities occurring mostly on the 'fringes', at Hunter Bay, around the airport and in the Big Creek (now Soldier's Creek) catchment.

Cultural Influences

The influence of the cultural and professional background of many of LHI's colonists is of great significance; not only regarding the ways in which they interacted with the LHI environment in an effort to make a living from it, but also in terms of how the community created a more complex island society in response to a shared home, shared resources, shared and disparate experiences and a shared distance from outside influences. The cultural background of the very first settlers to the island and their most recent experiences prior to arriving should not be underestimated as a defining factor in the ways in which they chose their settlement locations, used available resources and the day to day material culture of their lifestyle. Four Maori adults and three European adults who had

spent some considerable time living in Maori settlements would have viewed the empty landscape of LHI in a markedly different way to settlers who were fresh off the boat from Britain. Ashdown, Bishop and Chapman and their families would have arrived on LHI equipped with a whole ‘package’ of knowledge relating to the use of natural resources which were not dissimilar to those found in New Zealand: forest game birds, sea birds, fish, shellfish, eels, land snails, palm hearts and other wild foods. A melding of construction techniques seen in Maori settlements, New Zealand whaling stations and the Australian colonies was adapted to the locally available materials was to become a style that was continued in some form for many years following their initial occupation. How lasting other influences from the first settler group are likely to have been is perhaps not so obvious, however their settlement embodied a successful example of which and how the island’s resources were suitable for exploitation and probably provided a lasting model to later settlers.

Certainly, if the first settlers to arrive on the island were from a different background, much of the progression of the island’s settlement is likely to have unfolded in a similar way; however the amount of trial and error, and reliance on different food sources and introduced crops could have been significantly different during early settlement. In general, the influence of the whaling and general mariner background of many of the subsequent settlers also equipped them with particular experiences of marine gathering, fishing, sailing, oceanic weather conditions, and knowledge of the life-ways in other isolated and island communities in the Pacific and colonies. The shared professional background of many settlers influenced the general social flavour of the LHI settlement, with songs, music, language, dances, card games and dishes all being influence heavily by the whaling and sea faring background of many settlers, which was amplified by the general isolated nature of the settlement. This isolation also led to not only self sustaining community in terms of physical survival, but also the development of social structures such as an informal island ‘council’ of elders for dispute resolution; informal ‘transfers’ and other exchanges of land despite the lack of formal leasehold; the development of barter systems with fixed ‘prices’ for visitors; and the provision of health, education and religious ‘services’ amongst the residents to name a few. The cultural influences which held sway on LHI shifted in much the same way, and often in direct relation to the prevailing economic forces at work on the island at any given time.

Resource Use and Environmental Change

The factors influencing subsistence, location and spread of settlements described above also directly affected the environmental impact of the colonists on LHI: the intensity and type of subsistence the colonists sought influenced hunting, gathering and fishing volumes, the rate of land clearance, exhaustion of agricultural soils, erosion, sedimentation and regrowth. During the early settlement of the period when the provisioning trade formed the main basis of the island's economy, there was a sizable disparity between the small and slowly growing resident population and the 'real' size of the population being sustained by LHI's resources. Catering to the anticipated needs of whaling and trade vessels are very likely to have increased rates of clearance, planting, hunting, fishing and industry (smoking/salting meat, cutting firewood etc) at a rate significantly higher than what would be expected the settlement were only catering to the everyday subsistence of its residents. Paradoxically, if the ship trade had not persisted, the economic void may have been filled by other, more destructive ventures such as timber cutting, guano mining or intensive cash cropping. The one notable instance of cash crop cultivation on the island of the 'LHI red' onion for the Sydney market, did contribute to the clearance and intensive soil use at higher rates than those that would have been required if the islanders had maintained a purely subsistence economy after the decline of the ship trade. Similarly, efforts to trial other crop varieties in order to establish an export trade led to many different crop plants fodder grasses being introduced to the island, some of which went on to become pest species.

These environmental changes also had direct impacts on the island wildlife (both economic species and non-economic) through habitat loss, accidental killings, increased ease of targeted hunting (with the attrition of thickly vegetated forest retreats). The supply trade was also a likely catalyst for some targeted hunting and fishing for the provision of fresh and preserved fish, bird eggs and carcasses and mutton bird feathers for export trade. Impacts on faunal and floral communities have followed a discernable pattern: the first wave of extinctions is likely to have occurred during the first 30 years of permanent settlement. The largest game birds, the White Gallinule, White-Throated Pigeon and the large Tasman Booby all disappeared, while one agricultural pest, the Red-Fronted Parakeet was systematically exterminated. Around the same time another smaller game bird, the Woodhen had been appreciably impacted and began its steady retreat to the mountain summits, while the Masked Booby's nesting range on the main island had shrunk

significantly. The ranges and populations of other birds are likely to have been influenced, but the nature of this is not well documented. Any losses of plant species are even less documented, and perhaps the only one that can be speculated about is that of the mysterious ‘coconut’ described by the First Fleet visitors. If LHI did indeed have coconut trees in 1788, it is likely to have been an especially vulnerable species and if it still persisted in 1834, the coconut did not last very long beyond first settlement as the nuts would have been particularly sought after by provisioning ships due to its keeping qualities.

After this initial period of disappearances, there was a hiatus in outright (known) extinctions for approximately 50 years. The remaining LHI species seem to have reached equilibrium with the human occupants and it is quite likely that the settlers had acquired sufficient experience to consciously manage some or all of the remaining economic species and vegetation communities on the island. Certainly the need to maintain forest cover and/or plant windbreaks and protection of salt spray was well established by mid settlement. The final wave of extinctions came as a direct result of one historic accident which allowed the self-introduction of the Black Rat 1918. Hard upon the heels of the rat’s arrival came the significant population crash and eventual extinction of five small bird species, the extinction of at least two island invertebrates and extirpation of another and the loss of a sixth bird species as result of efforts to combat the rat pest. Other bird, invertebrate and reptile species declined to dangerous levels, only recovering after an extended period of moderately successful eradication plans and active management of remnant populations. These two significant episodes of faunal extinctions and extirpations serve to confirm the recognised impacts of human predation and habitat loss (first wave) and competition and predation by introduced species (second wave) observed in other Pacific island contexts. The loss and retreat of so many species, however, did not necessarily mean that LHI was significantly devoid of fauna for a long period. The creation of new habitat niches through both vegetation and landscape changes and those left vacant by extinct and extirpated species allowed an almost equal number of bird species to self introduce, or become successful on the island after introduction by human agency.

The overall changes to the vegetation regime of the island have been for the most part restricted to the lowlands of the island, which was largely driven by clearances for agriculture and grazing. Forest understorey changes in both the lowlands and mountains have been a result of feral animal grazing and trampling, encroachment of some pest plants and perhaps some harvesting of palm ‘cabbages’, while regeneration may have been

hampered by the practice of using palm seeds as pig fodder. Mangroves and other swamp/estuarine species have significantly retreated with the loss of swamp areas due to loss of forest cover and silting, water diversion and intensive settlement activities along permanent waterways. Die back and retreat of Banyans has been attributed not only to loss of canopy cover from salt spray, but also insect borer damage following the loss of most insectivorous birds after 1918. The retention of a significant portion of original (or near original) forest cover on the island (approximately 70% of the land area) is undoubtedly due in part to the large amount of land that occurs at high elevations which has such difficult access and steep gradient that it is not practically arable. If LHI had afforded a larger portion of habitable land it is quite possible that the nature of its occupation may have been significantly different and likely to have resulted in greater rates of deforestation, species loss, erosion and similar environmental changes. More available land may have encouraged greater rates of immigration, investment in cash crops and other industrial pursuits and would have likely made a far more attractive prospect as a penal colony or to any number of colonial investors for ventures such as wool and cattle grazing. The significance of LHI's ruggedness is potentially very great, and is in keeping with one of the factors identified by Rolett and Diamond (2004) that influence rates of human environmental impact on Pacific islands. Indeed, LHI has several of those identified factors in its favour, enabling a certain level of robustness in the island's ecosystem: it is steep, well watered, not too far removed from continental sources of nutrient replacement and during the majority of its settlement history, the inhabitants had some access to outside resources.

Prehistoric Analogue or Modern Anomaly?

Thus, the consequences of the colonisation of LHI are not divorced from its historic context: LHI is indeed a very useful analogue for prehistory, but only up to a certain point. The island's particular situation shares many features in common with other islands, both in and outside the Pacific. A moderately isolated island with high rates of endemism in floral and faunal communities; a range of coastal and terrestrial environments; an assortment of other resources (such as timber and stone); and with a relatively moderate climate, LHI is fairly centrally situated in the spectrum of variables that influence island environments and human settlers, and their ecological footprint. Further, its colonisers shared many features in common with those of other islands, particularly Pacific islands. A small, relatively slow

growing agricultural community with similar attendant animals (chickens, pigs, dogs and eventually rats); some measure of subsistence from native sources; and comparable construction and other industrial requirements, the beginnings of LHI settlement were particularly comparable to prehistoric contexts. Decision processes and behaviours relating to settlement location, expansion, abandonment, resource exploitation and management, and responses to lack of particular resources (substituting) are all likely to be comparable with reference to day to day subsistence. The historically recorded environmental changes on LHI, particularly the decline and extinction of several economic species, knock-on extinctions of other species and habitat retreats, further demonstrate LHI resemblance to other colonisations, and its potential usefulness as a comparative case.

However, these similarities only extend so far; once the emphasis moves from day to day subsistence, basic housing, proximity to resources and the immediate environmental consequences, the LHI example becomes less useful as an analogue for prehistoric examples. Aside from the particular influence LHI's history and economic background had on the island's settlement landscape (discussed above), the relative lack of time depth regarding LHI's 'colonisation' also throws into relief two important and somewhat opposing factors: the occurrence of LHI's settlement during the 'age of sail' and its particular backdrop of European colonial expansion in the Pacific. These two factors have served to accelerate many processes of environmental and social change, which have in turn been largely arrested by later ideals of conservation and changing economic imperatives in the Pacific and Australian colonies.

Lord Howe Island's particular historic situation meant that access to neighbouring landmasses, economic and cultural development opportunities with international visitors and the scale of trade and exchange networks were easier, more frequent and larger than those available to earlier colonists of the Pacific. Available technologies, culturally defined life-ways and economic forces influenced hunting and gathering behaviours and efficiencies, plant and land use and general approaches to environmental management. Interestingly, despite LHI's generally greater access to outside influences in comparison to most prehistoric examples, for its time the island community experienced a marked physical, social and economic isolation from contemporary Australian and New Zealand colonies. This isolation was due in part to a freak of colonial government indifference and the free settler, squatter nature of the settlement; but paradoxically for much of this time it was part of an international economic network spanning both the Pacific and Atlantic.

As Foulis wrote in 1851:

“Howe’s Island has for many years been a place of resort for whalers to procure wood, water, and fresh provisions, to enable them to prosecute their voyage without the necessity of going into Port. There were generally from 60 to 80 vessels in the course of the year that touched there for the above purpose, and it not unfrequently happened that we had English news from American vessels some weeks before the same was known in this Colony. ” pg 7

Eventually, the end of the island’s more marked period of isolation coincided with shifting societal values relating to ‘wilderness’ and ‘natural’ places and a significant shift in LHI’s economy. The need to conserve and maintain existing stands of palm forest for the benefit of the seed trade, and the growth of LHI’s tourist industry (which was based largely on the island’s ‘untouched’, ‘unspoilt’ natural beauty) encouraged a more conservative approach to the island’s remaining resources. Conservation and management efforts on LHI in recent years have served to halt further settlement expansion, faunal and floral introductions, hunting and gathering of most local resources, and have restricted fishing and settlement population size. Rat, mouse, cat, pig and goat eradication programs and captive breeding and monitoring of endangered species have also had several successes; as a general whole these behavioural changes have served to alter and/or halt the progression many of the expected patterns of island colonisation.

Is Lord Howe Really An Island?

In terms of biogeographical concerns such as the land and resource limits, environmental sensitivities and marine reliant food, transport and economy, Lord Howe is very much an ‘Island’. However, the LHI community is one that has a rather unusual place, for while it is indeed a nicely recorded example of human colonisation of a Pacific island, it is one which is not removed from its own historical and political context. In general most if not all patterns of colonisation identified elsewhere in the Pacific are exhibited on LHI, however the progression and end results of these are heavily influenced by LHI’s particular situation. Regardless, LHI represents an interesting and important example which allows an exploration of issues of similarity and difference of island colonisations, while also providing a well documented example of the influence of historic, geographic and political contexts and the varying scales of ‘island’ that can apply to one speck in a vast ocean.

References

Alcover, J.A., Sans, A. and Palmer, M. 1998 The extent of extinctions of mammals on islands. *Journal of Biogeography* 25(5):913-918.

Anderson, A. 1987 Food from Forest and Coast: hunting and fishing. Chapter 7 In Wilson, J. (ed) 1987 *From the Beginning: the archaeology of the Maori*. Auckland: Penguin Books.

Anderson, A. 1989 *Prodigious Birds: Moas and Moa-Hunting in New Zealand*. Cambridge University Press

Anderson, A. 1991a The chronology of colonization in New Zealand. *Antiquity* 65:767-795.

Anderson, A. 1991b *Race Against Time: the early Maori-Pakeha families and the development of the mixed-race population in southern New Zealand*. Dunedin: University of Otago Hocken Library.

Anderson, A. 2003 Investigating early settlement on Lord Howe Island. *Australian Archaeology* 57:98-102.

Anderson, A. and McGlone, M. 1991 Living on the edge: prehistoric land and people in New Zealand. In Dodson, J. (ed) 1991 *The Naïve Lands: prehistory and environmental change in Australia and the Southwest Pacific*. Sydney: Longman Cheshire. Pp 199-241.

Anderson, A. and White, P. (eds) 2001 *The Prehistoric Archaeology of Norfolk Island, Southwest Pacific*. Records of the Australian Museum Supplement 27.

Anon 1849 *Perils, Pastimes, and Pleasures of an Emigrant in Australia, Vancouver's Island and California*. London: Unknown

Anon. 1880 Lord Howe Island. *The Illustrated Sydney News and New South Wales Agriculturist and Gazette*. 15/5/1880 Vol 17 No 5.

Anon 1892 *Historical Records of New South Wales Volume 1 Part 2 Phillip 1783-1792*. Sydney: Charles Potter Government Printer.

Anon 1898 Untitled map of Lord Howe Island showing permissive occupancies and land use. Held at the National Library of Australia.

Anon 1930 Lord Howe Island. *Bank Notes* 12(4):12-16.

Albert, L.S. and Kent, K. 1949 *The Complete Button Book*. Stratford: John Edwards Publisher.

Allison, P. 1998 Kinchega Archaeological Research Project and Survey of the Old Kinchega Homestead. Report prepared for Cultural Heritage Services Division, New South Wales National Parks and Wildlife Service.

Allison, P. 2003 The Old Kinchega Homestead: doing household archaeology in outback New South Wales, Australia. *The International Journal of Historical Archaeology*. 7(3): 161-194.

Aplin, G. 1988 People in an Alien Landscape: early Sydney's environmental context. Chapter One *In* Aplin, G. (ed) *A Difficult Infant: Sydney Before Macquarie*. Kensington: New South Wales University Press.

Asiatic Pheasants 19th Century Staffordshire Blue Transfer Printed Pottery: Pattern History. <http://www.asiaticpheasants.co.uk/newpatthist.html> Accessed 23/3/06.

Australian Bureau of Statistics 2001 Census 2001: Lord Howe Island Snapshot. www.abs.gov.au. Accessed 23/6/2003.

Australian Bureau of Meteorology 2006 Averages for Lord Howe Island Aero. http://www.bom.gov.au/climate/averages/tables/cw_200839.shtml. Accessed: 26/7/2006

Baglin, E. and Baglin, D. 1979 *Australian Chimneys and Cookhouses*. French's Forest: Murray Child and Company.

Barnett, B.D. and Rudd, R.L. 1983 Feral dogs of the Galapagos Islands: Impact and control. *International Journal for the Study of Animal Problems* 4: 44-58.

Beaudry, M.C. 1989 The Lowell Boott Mills Complex and Its Housing: Material Expressions of Corporate Ideology. *Historical Archaeology*, 23:19

Belich, J. 1996 *Making Peoples: a history of the New Zealanders from Polynesian Settlement to the end of the nineteenth century*. Auckland: Penguin Press.

Bellwood, P. 1996 Early agriculture and the dispersal of the southern Mongoloids. *In* Akazawa, T. & Szathmary, E.J.E. (eds) *Prehistoric Mongoloid Dispersals*. Oxford: Oxford University Press. Pp 289-302.

Bender, B. 1993 b Introduction: Landscape – Meaning and Action. *In*: Bender, B. (ed.) *Landscape: Politics and Perspectives*: 1-17. Oxford: Berg.

Best, E. 1925 Maori Agriculture: the cultivated food plants of the natives of New Zealand, and some account of the native methods of agriculture, its ritual and origin myths. *Dominion Museum Bulletin No 9*.

Birmingham, J. 1984 Archaeological Report. *In* No Title. Subsidiary report for Pannell, Kerr, Forster Services Proprietary. Lord Howe Island Regional Environmental Plan – Tourism Study Final Report to the Lord Howe Island Board.

Birmingham, J., Kelly, M. and Tanner, H. 1984 No Title. Subsidiary report for Pannell, Kerr, Forster Services Proprietary. Lord Howe Island Regional Environmental Plan – Tourism Study Final Report to the Lord Howe Island Board.

Bonyhady, T. 2000 *The Colonial Earth*. Melbourne: Melbourne University Press.

Boow, J. 1991 *Early Australian Commercial Glass: manufacturing processes*. The Heritage Council of New South Wales. Department of Planning and Heritage Council of New South Wales.

Borough of Blackburn Museum and Art Gallery 1978 *Davenport Pottery and Porcelain 1794 – 1887*. Blackburn: Borough of Blackburn Recreation Department.

Bowdler, S. 1979 Sieving Seashells: midden analysis in Australian archaeology. In Connah, G. (ed) 1983 *Australian Field Archaeology: a guide to techniques*. Canberra: Australian Institute of Aboriginal Studies.

Burke, H. 1999 *Meaning and Ideology in Historical Archaeology: Style, Social Identity and Capitalism in an Australian Town*. New York: Plenum Press.

Burke, H. and Smith, C. 2004 *The Archaeologist's Field Handbook*. Crows Nest: Allen and Unwin.

Burney, D.A. 1997 Tropical Islands as Paleoecological Laboratories: Gauging the Consequences of Human Arrival. *Human Ecology* 25(3):437-457.

Busch, J. 1991 Second Time Around: a look at bottle reuse. In Miller, G.L., Jones, O.R., Ross, L.A. and Majewski, T. (eds) 1991 *Approaches to Material Culture Research for Historical Archaeologist*. California: Society of Historical Archaeology.

Buzacott, A. 1866 *Mission Life in the Islands of the Pacific: being a narrative of the life and labour of the Rev. A. Buzacott, missionary of Rarotonga, for some time co-worker with the Rev. John Williams, martyr of Erromanga*. London: John Snow and Co.

Byrne, D., Brayshaw, H. and Ireland, T. 2000 *Social Significance: A Discussion Paper* Hurstville: NSW National Parks and Wildlife Service.

Cameron, I. 1987 *Lost Paradise: the exploration of the Pacific*. Massachusetts: Salem House Publishers.

Cannon, M. 1973 *Life in the Country: Australia in the Victorian Age 2*. Melbourne: Thomas Nelson Australia Pty Ltd.

Cannon, M. 1975 *Life in the Cities: Australia in the Victorian Age 3*. Melbourne: Thomas Nelson Australia Pty Ltd.

Clarson, W. 1882 *The Island of Lord Howe: the Madeira of the Pacific*. Sydney: Gibbs, Shallard and Co.

- Cloete, P.L. 1869 Official Report by the Water Police Magistrate: Homicide at Lord Howe Island. *In* Cloete, P.L, Moore, C. and Hill, E.S. 1870 *Lord Howe Island, Official Visit by the Water Police Magistrate and the Director of the Botanic Gardens, Sydney; together with a description of the island by Edward S. Hill*. Sydney: Thomas Richards, Government Printer.
- Coleman, N. 1988 *What Shell is That?* Sydney: Lansdowne Press.
- Coleman, N. 2002 *Lord Howe Island Marine Park: world heritage wildlife guide*. Springwood: Neville Coleman's Underwater Geographic Pty Ltd.
- Collins, S. 2005 Personal Communication.
- Commonwealth of Australia 2002 *Lord Howe Island Marine Park (Commonwealth Waters): management plan*. Environment Australia: Canberra.
- Commonwealth Scientific and Industrial Research Organization 2000 CSIRO Marine Research: the facts – the East Australian Current. www.marine.csiro.au/LeafletsFolder/37eac/. Accessed 29/8/2006.
- Cornwall, J.W. 1966 *Bones for the Archaeologist*. New York: Macmillan.
- Corrie, A. T. 1878 A Visit to Lord Howe Island. *Unknown Journal Publication*, January 28: 136-143. National Library of Australia N919.481031 C825.
- Cosgrove, D. E. 1984 *Social Formation and Symbolic Landscape*. London: Croom Helm.
- Cowan, P.E., Chilvers, B.L., Efford, M.G. and McElrea, G.J. 1997 Effects of possum browsing on northern rata, Orongorongo Valley, Wellington, New Zealand. *Journal of the Royal Society of New Zealand* 27(2):173-179.
- Coysh, A.W. and Henrywood, R.K. 1982 *The Dictionary Blue and White Printed Pottery 1780-1880*. Volume 1. Suffolk: Antique Collectors Club.
- Cumming, G.H. 1998 *Freemasonry on Lord Howe Island*. Sydney: Grahame H. Cumming.
- Dakin, W.J. 1987 *Australian Seashores*. North Ryde: Angus and Robertson.
- Dallas, K. M. 1969 *Trading Posts or Penal Colonies: the commercial significance of Cook's New Holland route to the Pacific*. Devonport: C.L. Richmond and Sons Pty Ltd.
- Daniels, T.J. and Bekoff, M. 1989 Population and social biology of free-ranging dogs, *Canis familiaris*. *Journal of Mammology* 70:754-762.
- Darvill, T. 1999 The Historic Environment, Historic Landscapes and Space-Time-Action Models in Landscape Archaeology. *In*: Ucko, P.J. and Layton, R. (eds) *The Archaeology and Anthropology of Landscape: Shaping Your Landscape*: 104-118 New York: Routledge.

David, A. 1995 *The Voyage of HMS Herald: to Australia and the South-west Pacific 1852-1861 under the command of Captain Henry Mangles Denham*. Carlton: The Miegunyah Press.

Davies, M. and Buckley, K. 1987 *Port Arthur Conservation and Development Project: Archaeological Procedures Manual*. Hobart: Parks & Wildlife Service (DPIWE), Occasional Paper Number 13.

Denham, H. M. 1853 Remarks upon Lord Howe Island by Captain Denham, R.N., F.R.S. Communicated at the request of His Excellency Sir Charles Augustus Fitz Roy, Governor General of the Australian Colonies. Correspondence No 12, Enclosure No 1. In New South Wales Government (Ed.) *Correspondence Relative to Proposed New Penal Settlement at Lord Howe Island*: New South Wales Parliamentary Accounts and Papers, pp. 12-13.

De Vries, T. 1984 The Giant Tortoise: A Natural History Disturbed by Man. In *Key Environments: Galapagos*. Oxford: Pergamon Press.

Diamond, J. 1997 *Guns, Germs and Steel: a short history of everybody for the last 13000 years*. London: Vintage.

Diamond, J. 2005 *Collapse: How Societies Choose to Fail or Survive*. London: Allen Lane.

Dieffenbach, E. 1843 *Travels in New Zealand: with contributions to the geography, geology, botany, and natural history of that country*. London: John Murray.

Dodson, J.R. 1982 Modern Pollen Rain and Recent Vegetation History on Lord Howe Island: evidence of human impact. *Review of Palaeobotany and Palynology* 38:1-21.

Dowding, J.E. and Murphy, E.C. 2001 The impact of predation by introduced mammals on endemic shorebirds of New Zealand: a conservation perspective. *Biological Conservation* 99:47-64.

Downes, M. 1996 *Anare Research Notes 97: Indexing sealer's logbooks from Heard Island*. Kingston: Antarctic Division Publications Office.

Druett, J. 1991 *Petticoat Whalers: whaling wives at sea, 1820-1920*. Auckland: Collins Publishers New Zealand.

Edgecombe, J. 1987 *Lord Howe Island: world heritage area*. Balmain: Australian Environmental Publications.

Edgecombe, J. 1991 *Norfolk Island, South Pacific: island of history and many delights*. Sydney: Rodenprint.

English Flow Blue China: a brief history.

<http://www.grammytique.com/library/Flow%20Blue/Flowbluehistory.html>. Accessed 14/6/05

Environment Australia 2002 Lord Howe Island Phasmid – *Dryococelus australis*. <http://www.deh.gov.au/biodiversity/threatened/publications/nsw2002.html>. Accessed 10/1/2006.

EPBC Committee 2004 Nomination for listing a native species under the *Environment Protection and Biodiversity Conservation Act 1999*: *placostylus bivaricosus*.

Fenton, E. 2004 Personal Communication.

Finch, A. and Finch, V. 1967 *Lord Howe Island*. Adelaide: Rigby Ltd.

Finn, J. 2005 Personal Communication

Fitzgerald, R.D. 1870 Account of Lord Howe Island *In* Cloete, P.L, Moore, C. and Hill, E.S. 1870 *Lord Howe Island, Official Visit by the Water Police Magistrate and the Director of the Botanic Gardens, Sydney; together with a description of the island by Edward S. Hill*. Sydney: Thomas Richards, Government Printer.

Fitzhugh, B. and Hunt, T.L. 1997 Introduction: Islands as Laboratories: Archaeological Research in Comparative Perspective. *Human Ecology* 25(3):379-383.

Flannery, T. 1994 *The Future Eaters: an ecological history of the Australasian lands and people*. Sydney: Reed.

Foulis, J. 1851 Statement of circumstances in reference to Lord Howe's Island, situated off the coast of New South Wales, between the Heads of Port Jackson and Norfolk Island. Correspondence No 5. *In New South Wales Government (ed) 1853 Correspondence Relative to Proposed New Penal Settlement at Lord Howe Island*. New South Wales Parliamentary Accounts and Papers. Pp 5-7

Gallagher, D. and Price, R. 1987 Thomas Davidson and Co, Glasgow. *In* Davey, P. (ed) 1987 *The Archaeology of the Clay Tobacco Pipe*. No 10 Scotland. BAR British Series 178. Pp 110-138.

Gardiner, J. and Knox, S. 1997 Identifying, Assessing, Conserving and Managing elements of a cultural landscape: a case study of the Alstonville Plateau, north-eastern New South Wales. *Historic Environment*, 13(3-4): 45-51.

Gibbs, M. 1998 Colonial Boats and Foreign Ships: the history and archaeology of nineteenth century whaling in Western Australia. *In* Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.

Gilbert, T. N.D. *Voyage from New South Wales to Canton, in the Year 1788, with views of the island's discovered*. London: George Stafford

Godden, G. 1999 *New Handbook of British Pottery and Porcelain Marks*. London: Barrie and Jenkins.

Godden Mackay Pty Ltd 1999 *The Cumberland/Gloucester Streets site, The Rocks: archaeological investigation report*. Redfern: Godden Mackay Pty Ltd.

Gojak, D. 1998 An Historical and Archaeological Overview of the Whaling Industry in New South Wales and Norfolk Island. In Lawrence, S. a. S., M. (Ed.) *The Archaeology of Whaling in Southern Australia and New Zealand* Gundaroo: The Australian Society for Historical Archaeology and the Australian Institute for Maritime Archaeology. Special Publication No 10.

Goodman, D. 1994 *Gold Seeking: Victoria and California in the 1850s*. St Leonards: Allen and Unwin.

Grady, D. 1986 *Sealers and Whalers in New Zealand Waters*. Auckland: Methuen Publishers Ltd.

Greenwood, G. 1943 The Contact of American Whalers, Sealers and Adventurers with the New South Wales Settlement. *Royal Australian Historical Society Journal*, 29: 133-156.

Groves, C. 2004 Personal Communication.

Hamilton, A. 1908 Fishing and Seafoods of the Ancient Maori. *Dominion Museum Bulletin No 2*.

Harada, K. and Glasby, G.P. 2000 Human impact on the environment in Japan and New Zealand: a comparison. *The Science of the Total Environment* 263:79-90.

Harvey, T. 2001 Missing Persons: the Chinese in Townsville, 1864-1930. Unpublished Honours Thesis, School of Anthropology, Archaeology and Sociology, James Cook University.

Haywood, P. 2002 *Hearing the Call: music and social history on Lord Howe Island*. Lord Howe Island: LHI Arts Council.

Hill, E.S. 1870 Account of Lord Howe Island In Cloete, P.L, Moore, C. and Hill, E.S. 1870 *Lord Howe Island, Official Visit by the Water Police Magistrate and the Director of the Botanic Gardens, Sydney; together with a description of the island by Edward S. Hill*. Sydney: Thomas Richards, Government Printer.

Hindwood, K. A. 1940 *The Birds of Lord Howe Island*. Sydney: Australian Museum.

Hines, M. 1960 *Lord Howe Island: tourist guide*. Sydney: Harbour Press.

Hoeck, H.N. 1984 Introduced Fauna. Chapter 16 In Perry, R. (ed) 1984 *Key Environments: Galapagos*. Oxford: Pergamon Press.

- Holdaway, R. and Anderson, A. 2001 Avifauna from the Emily Bay Settlement Site, Norfolk Island: a preliminary account. *Records of the Australian Museum, Supplement 27*. 2001:85-100.
- Howell-Meurs, S. 2000 Nineteenth-century Diet in Victoria: the faunal remains from Viewbank. *Australasian Historical Archaeology* 18: 39-46.
- Hughes, B. and Hughes, T. 1968 *The Collector's Encyclopaedia of English Ceramics*. London: Abbey Library.
- Hughes, R. 1987 *The Fatal Shore*. London: Pan Books Ltd.
- Hutton, I. 1990 *Birds of Lord Howe Island: Past and Present*. Coffs Harbour: Ian Hutton.
- Hutton, I. 1998 *The Australian Geographic Book of Lord Howe Island*. Terry Hills: Australian Geographic Pty Ltd.
- Hutton, I. 2002 *A field guide to the plants of Lord Howe Island*. Lord Howe Island: Ian Hutton.
- Hutton, I. 2004 Personal Communication.
- IUCN 2006a 2006 IUCN Red List of Threatened Species. <http://www.iucnredlist.org/>. Accessed 28/12/2006
- IUCN 2006b 2006 IUCN Red List of Threatened Species: *Mirounga leonina*. <http://www.iucnredlist.org/search/details.php/13583/all>. Accessed 28/12/2006
- IUCN 2006c 2006 IUCN Red List of Threatened Species: *Sula tasmani*. <http://www.iucnredlist.org/search/details.php/61927/summ>. Accessed 28/12/2006.
- Jacomb, C. 1998 Shore Whaling Sites of Banks Peninsula: an archaeological survey. In Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.
- Johnson, W. 2005 Personal Communication.
- Karskens, G. 1999 *Inside the Rocks: the archaeology of a neighbourhood*. Alexandria: Hales and Iremonger Pty Ltd.
- Kelly, M. 1984 History. In Lord Howe Island Regional Environmental Plan – Tourism Study Final Report. Pannell, Kerr, Forster Services Proprietary.
- Kennedy, D.M. and Woodroffe, D.D. 2000 Holocene lagoonal sedimentation at the latitudinal limits of reef growth, Lord Howe Island, Tasman Sea. *Marine Geology* 169: 287-304.

Kent, G. 1975 *Company of Heaven: early missionaries in the south seas*. Wellington: A.H. & A.W. Reed.

Kirch, P.V. 1982 The Impact of the Prehistoric Polynesians on the Hawaiian Ecosystem. *Pacific Science* 36(1):1-14.

Kirch, P.V. 1997a Microcosmic Histories: Island Perspectives on 'Global' Change. *American Anthropologist* 99(1):30-42.

Kirch, P.V. 1997b Introduction: the environmental history of oceanic islands. Chapter one In Kirch, P.V. and Hunt, T.L. (eds) 1997 *Historical Ecology in the Pacific Islands: Prehistoric Environmental and Landscape Change*. New Haven: Yale University Press.

Kirch, P.V. 2000 *On the Road of the Winds: An Archaeological History of the Pacific Islands before European Conquest*. Berkeley: University of California Press.

Kirch, P.V. and Hunt, T.L. (eds) 1997 *Historical Ecology in the Pacific Islands: Prehistoric Environmental and Landscape Change*. New Haven: Yale University Press.

Kostoglou, P. 1998 'When Whaling was a War': An examination of conflict in Tasmanian bay whaling. In Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.

Lamb, R. 1989 Identification and Assessment of Rural Cultural Landscapes – The National Trust's Method: and a Relevant Case Study. *Historic Environment*, 7(2): 38-44.

Lawrence, S. 1998 An Integrated Approach to the Archaeology of Whaling. In Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.

Lawrence, S. 2000 *Dolly's Creek: an archaeology of a Victorian goldfields community*. Melbourne: Melbourne University Press.

Lawrence, S. 2006 *Whalers and Free Men: life on Tasmania's colonial whaling stations*. Melbourne: Australian Scholarly Publishing Pty Ltd.

Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.

Leach, H. 1987 The Land, The Provider: gathering and gardening. Chapter Eight In Wilson, J. (ed) *From the Beginning: the archaeology of the Maori*. Auckland: Penguin Books.

- Lennon, J. 1997 *Case Study of the Cultural Landscapes of the Central Victorian Goldfields*. Australia: State of the Environment Technical Paper Series: Natural and Cultural Heritage. Canberra: Department of the Environment.
- Lennon, J. 1998 Whaling at Wilsons Promontory, Victoria in the 1840s. *In* Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.
- Leone, M. P. and Potter, P. B. 1999 *Historical Archaeologies of Capitalism*. New York: Plenum Press.
- Lord Howe Island Central School 1979 *School Centenary, Lord Howe Island 1879-1979*. Lord Howe Island.
- Lyman, R.L. 1987 On Zooarchaeological Measures of Socioeconomic Position and Cost-Efficient Meat Purchases. *Historical Archaeology* 21(1):58-66.
- Macdonald, J.D. 1853 Remarks on the Natural History and Capabilities of Lord Howe Island. Correspondence 12, Enclosure 2. *In* New South Wales Government (ed) 1853 *Correspondence Relative to Proposed New Penal Settlement at Lord Howe Island*. New South Wales Parliamentary Accounts and Papers. Pp 13-17
- Mackay, D. 1992 *Frontier New Zealand: the search for Eldorado 1800-1920*. Auckland: Harper Collins Publishers (NZ) Ltd.
- MacPhail, M.K. 1996 Report: Latest Holocene palynological sites, Lord Howe Island. Report to Department of Archaeology and Natural History, Research School of Pacific and Asian Studies, Australian National University, Canberra.
- Maiden, J.H. 1898 Vegetation of Lord Howe Island. *Linnean Society of New South Wales Proceedings* 23:112-158.
- Man and Molluscs 2001 Man and Mollusc's Database of Edible Molluscs: terrestrial and freshwater molluscs.
http://www.manandmollusc.net/molluscan_food_files/molluscan_food_terrestrial.html
- Mawer, G. A. 1999 *Ahab's Trade: the saga of south seas whaling*. St Leonards: Allen and Unwin.
- Mayo, W.L. and Mendelsohn, B.M 1998 *The Postal History and Philately of Lord Howe Island NSW*. Avalon: Lord Howe Island Philatelic Study Group.
- McDougall, I., Embelton, B.J.J. and Stone, D.B. 1981 Origin and evolution of Lord Howe Island, Southwest Pacific. *Journal of Geological Society Australia* 28:155-176.
- McFadgen, B. 1987 Impact on the Landscape: environmental change. Chapter 5 *In* Wilson, J. (ed) *From the Beginning: the archaeology of the Maori*. Auckland: Penguin Books.

- McFadyen, K. 1992 *Pinetrees Lord Howe Island 1842-1992: a brief history of the Andrews-Nichols-Kirby families*. Lord Howe Island: Pinetrees.
- McKenzie, L. 1998 Whaling Sites in Victoria. In Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.
- McNab, R. 1913 *The Old Whaling Days: a history of southern New Zealand from 1830 to 1840*. Wellington: Whitcombe and Tombs Ltd.
- Meyer, J.Y. and Florence, J. 1996 Tahiti's native flora endangered by the invasion of *Miconia calvescens* DC. (Melastomataceae). *Journal of Biogeography* 23: 775-781.
- Milberg, P. and Tyrberg, T. 1993 Naïve birds and noble savages – a review of man-caused prehistoric extinctions of island birds. *Ecography* 16(3):229-250.
- Miller, G. and Sullivan, C. 1991 Machine-Made Glass Containers and the End of Production for Mouth-Blown Bottles. In Miller, G.L., Jones, O.R., Ross, L.A. and Majewski, T. (eds) 1991 *Approaches to Material Culture Research for Historical Archaeologist*. California: Society of Historical Archaeology.
- Moore, C. 1869 Sketch of the Vegetation of Lord Howe Island. In *Lord Howe Island: Official visit by the water police magistrate and the director of the botanic gardens, Sydney; together with a description of the island by Edward S. Hill*. Sydney: Thomas Richards, Government Printer.
- Moorehead, A. 1966 *The Fatal Impact: an account of the invasion of the South Pacific 1767-1840*. Harmondsworth: Penguin Books Ltd.
- Morwood, M. and Oosterzee, P. 2007 *The Discovery of the Hobbit: the scientific breakthrough that changed the face of human history*. Millers Point: Random House.
- Mrozowski, S.A. 1999 Colonization and the Commodification of Nature. *International Journal of Historical Archaeology* 3(3):153-166.
- Nash, M. 1998 A survey of the Tasmanian Shore-Based Whaling Industry. In Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.
- Nichols, D. 2006 *Lord Howe Island Rising*. Frenchs Forest: Tower Books.
- Nicholls, M. 1952 *A History of Lord Howe Island*. Hobart: Mercury Press
- New South Wales Legislative Assembly Votes and Proceedings 1895

New South Wales Legislative Assembly Notes and Proceedings 1890 Lord Howe Island: Complaints made against Mr T.R.Icely, visiting magistrate to.

New South Wales National Parks and Wildlife Service 1989 Environmental Impact Report for Radio and TV Earth Satellite Stations on Lord Howe Island. Report to the Lord Howe Island Board

New South Wales National Parks and Wildlife Service 2000 *Placostylus bivaricosus* (a large land snail) – endangered species listing.
<http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Placostylus+bivaricosus>. Accessed 22/8/2005.

Nonte, G.C. 1973 *Firearms Encyclopaedia*. London: Wolfe Publishing Ltd.

Nutley, D. and Smith, T. 2002 *Lord Howe Island Maritime Archaeological Survey*. Sydney: New South Wales Heritage Office, Maritime Heritage Project.

OBIS 2006 OBIS Sea Map: *Mirounga leonina*.
<http://seamap.env.duke.edu/species/tsn/180671>. Accessed 28/12/2006.

Ohler, J. G. 1999 Modern Coconut Management: palm cultivation and products.
<http://ecoport.org/ep?SearchType=earticleView&earticleId=127&page=1278>. Accessed: 25/7/2006

Orser, C.E. Jr and Nekola, A.M. 1996 Plantation Settlement from Slavery to Tenancy: An Example from a Piedmont Plantation in South Carolina. In: Orser, C.E. Jr (ed.) *Images from the Recent Past: Readings in Historical Archaeology*: 392-415. Walnut Creek: Altamira Press.

Park, R. 1982 *Norfolk Island and Lord Howe Island*. Dover Heights: Serendip.

Pearson, M. and Stehberg, R. 2006 Nineteenth Century Sealing Sites on Rugged Island, South Shetland Islands. *Polar Record* 42(223):335-347.

Perry, R. 1984 The Islands and their History. Chapter One In Perry, R. (ed) 1984 *Key Environments: Galapagos*. Oxford: Pergamon Press.

Phillips, P.A.R. 2002 *The Flying Boat Days: the early aviation history of Lord Howe Island*. Adelaide: Seaview Press.

Pickard, J. 1983 Vegetation of Lord Howe Island. *Cumminghamia* 1(2):133-266

Prickett, N. 1998 The New Zealand Shore Whaling Industry. In Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.

- Prickett, N. 2002 *The Archaeology of New Zealand Shore Whaling*. Wellington: New Zealand Department of Conservation.
- Rabone, H. R. 1940 *Lord Howe Island: its discovery and early associations 1788 to 1888*. Sydney: Australis.
- Rainbird, P. 2002 A message for our future? The Rapa Nui (Easter Island) ecodisaster and Pacific island environments. *World Archaeology* 33(3):436-451.
- Rankin, G. 1896 No Title [Writes of visit to Lord Howe Island on the Thetis in 1882]. Mitchell Library Newspaper Cuttings Volume 52 p 268-269, Sydney
- Recher, H.F. and Clark, S.S. 1974a A Biological Survey of Lord Howe Island With Recommendation of the Conservation of the Island's Wildlife. *Biological Conservation* 6(4): 263-273
- Recher, H.F. and Clark, S.S. 1974b Environmental Survey of Lord Howe Island. Report to the Lord Howe Island Board.
- Reid, F. 1920 Isle of Adventure: Lord Howe Island. *Sea Land and Air*. 3(32): 487-491
- Renfrew, C. and Bahn, P. 1996 *Archaeology: theories, methods and practice*. London: Thames and Hudson.
- Rice, G. W. (Ed.) 1992 *The Oxford History of New Zealand*. Auckland: Oxford University Press.
- Richards, R. 1982 *Whaling and Sealing at the Chatham Islands*. Canberra: Roebuck.
- Rockman, M. and Steele, J. (eds) 2001 *Colonization of Unfamiliar Landscapes: the archaeology of adaptation*. London: Routledge.
- Rolett, B. and Diamond, J. 2004 Environmental predictors of pre-European deforestation on Pacific islands. *Nature* 431:443-446.
- Rolls, E. 1992 *Sojourners: flowers and the wide sea*. St Lucia: University of Queensland Press.
- Romer, A.S. 1955 *The Vertebrate Body*. London: W.B. Saunders Company.
- Rotman, D.L. and Nassaney, M.S. 1997 Class, Gender, and the Built Environment: Deriving Social Relations from Cultural Landscapes in Southwest Michigan. *Historical Archaeology*, 31(2):42-62.
- Rout, E.A. 1926 *Native Diet: with numerous practical recipes*. London: William Heinemann.
- Ruth, P. 1982 *Norfolk Island and Lord Howe Island*. Dover Heights: Serendip.

Sainsbury, I. 2004 Personal Communication

Schmid, E. 1972 *Atlas of Animal Bones: for prehistorians, archaeologists and quaternary geologists*. Amsterdam: Elsevier Publishing Company.

Schule, W. 1993 Mammals, Vegetation and Initial Human Settlement of the Mediterranean Islands: A Palaeoecological Approach. *Journal of Biogeography* 20(4):399-411.

Shephard, S. 2000 *Pickled, Potted and Canned: the story of food preserving*. London: Headline Book Publishing.

Sherer, John 1853 (ed) *The Gold Finder of Australia: how he went, how he fared and how he made his fortune*. London: Clarke, Beeton & Co. Penguin Colonial Facsimile Edition 1973.

Shick, R. 2004 Personal Communication

Simmons, A.H. 1999 *Faunal Extinction in an Island Society: Pygmy Hippopotamus Hunters of Cyprus*. New York: Kluwer Academic/Plenum Publishers.

Smith, I.W.G. 1989 Maori Impact on the Marine Megafauna: pre-European distributions of New Zealand sea mammals. In Sutton, D.G. (ed) 1989 *Saying so doesn't make it so: papers in honour of B. Foss Leach*. New Zealand Archaeological Association Monograph 17.

Smith, I.W.G. 2002 *The New Zealand Sealing Industry: history, archaeology and heritage management*. Wellington: New Zealand Department of Conservation.

Smith, K. 1997 Ethnobotanical Leaflets: *Coco nucifera*.
<http://www.siu.edu/~ebl/leaflets/coconut/htm>. Accessed: 25/7/2006

Smyth, A. B. 1788 Fidon, P.G. & Ryan R.J. (eds) 1979 *The Journal of Arthur Bowes Smyth, surgeon, Lady Penrhyn, 1787-1789*. Sydney: Australian Documents Library

Spriggs, M. 1996 What is southeast Asian about Lapita?. In Akazawa, T. & Szathmary, E.J.E. (eds) *Prehistoric Mongoloid Dispersals*. Oxford: Oxford University Press. Pp 324-348.

Spriggs, M. 2001 Future Eaters in Australia, Future Eaters in the Pacific? Early Human Environmental Impacts. *Australian Archaeology* 52:53-59.

Spriggs, M. and Anderson, A. 1993 Late Colonization of east Polynesia. *Antiquity* 67:2001-2019.

Staniforth, M. 1998 Three Whaling Station Sites on the West Coast of South Australia: Fowlers bay, Sleaford Bay and Streaky Bay. In Lawrence, S. and Staniforth, M. (eds) 1998 *The Archaeology of Whaling in Southern Australia and New Zealand*. The

Australasian Society for Historical Archaeology and The Australian Institute for Maritime Archaeology Special Publication No 10.

Stevens, C. 1892-1900 Unpublished diary kept at Lord Howe Island from 27th September 1892 to 19th December. Held at the NSW State Records Office City (COD 209)

Stevenson, D. 1998 *Agendas in Place: Urban and Cultural Planning for Cities and Regions*. Rockhampton: University of Central Queensland.

Stone, C.P. and Anderson, S.J. 1988 Introduced Animals in Hawaii's Natural Areas. *Proceedings of the Thirteenth Vertebrate Pest Conference*. Lincoln: University of Nebraska.

T.D.E. 1893a A New South Wales Dependency (part I). *Sydney Morning Herald*, Saturday, 9th September, 1893

T.D.E. 1893b A New South Wales Dependency (part II). *Sydney Morning Herald*, Saturday, 16th September 1893.

Thiercelin, L. 1866 *Travels in Oceania: Memoirs of a Whaling Ships' Doctor 1866*. Dunedin: University of Otago Press.

Thomas, J. 1993 The Politics of Vision and the Archaeologies of Landscape. In: Bender, B. (ed.) *Landscape: Politics and Perspectives*: 19-48. Oxford: Berg.

Thomas, J. 2001 Archaeologies of Place and Landscape. In: Hodder, I. (ed.) *Archaeological Theory Today*: 165-186. Cambridge: Polity Press.

Thompson, B. 2004 Personal Communication

Thompson, S. 2004 Personal Communication

Thompson, S. 2004 Environmental Assessment Report: archaeological investigation of settlement development on Lord Howe Island. Report for the Lord Howe Island Board.

Thorton, E. 1971 *Darwin's Islands: A natural history of the Galapagos*. New York: Natural History Press.

Tilley, C. 1994 *A Phenomenology of Landscape: Places, Paths and Monuments*. Oxford: Berg.

UNEP-WCMC (United Nations Environment Programme-World Conservation Monitoring Centre) 1996 Protected Areas Programme - World Heritage Sites: Lord Howe Island. www.unep-wcmc.org/protected_areas/data/wh/lordhowe.html. Accessed 12/8/2006

Van Rensselaer, S. Banded Creamware. In Attenbury, P. (ed) 1966 *English Pottery & Porcelain: an historical survey*. London: Peter Owen.

- van Tets, G.F., Meridith, C.W., Fullager, P.J. and Davidson, P.M. 1988 Osteological differences between *Sula* and *Morus*, and a description of an extinct new species of *Sula* from Lord Howe and Norfolk Islands, Tasman Sea. *Notornis* 35:35-37
- Vickery, P.D., Hunter, M.L. and Wells, J.F. 1992 Evidence of incidental nest predation and its effects on nests of threatened grassland birds. *Oikos* 63:281-288.
- Villiers, A. 1937 *Cruise of the Conrad*. London: Hodder and Stoughton Limited.
- Ward, R. 1958 *The Australian Legend*. Melbourne: Oxford University Press.
- White, H.J. 1835 Report on Lord Howe's Island. Correspondence No 3, enclosure No 3 In New South Wales Government 1853 Proposed New Penal Settlement at Lord Howe Island: a collection of papers submitted by the Governor General to the Legislative Assembly. *New South Wales Parliamentary Accounts and Papers*, 1853.
- Young, B. 2003 and 2004 Personal Communication
- Whipple, A. B. C. 1979 *The Whalers*. Amsterdam: Time-Life Books.
- Wilson, A. J. G. (Ed.) 1994 *Flora of Australia Vol 49: Oceanic Islands 1*. Canberra: Australian Government Publishing Service.
- Wilson, J. B. 1882 *Report on the Present State and Future Prospects of Lord Howe Island*. Sydney: Thomas Richards, Government Printer.
- Wilson, G. 2004 Personal Communication.
- Young, L.B. 1999 *Islands: Portraits of Miniature Worlds*. New York: W.H. Freeman and Company.
- Zierden, M. 1996 The Urban Landscapes, the Work Yard, and Archaeological Site Formation Processes in Charleston, South Carolina. In: deCunzo (ed.) *Historical Archaeology and the American Landscape*: 285-317. Winterther: University of Tennessee Press.