Landscapes of deception: a multi-modal exploration of the Indigenous cultural heritage values of Deception Bay, Southeast Queensland

Maria Majella Cotter

Southern Cross University

Publication details

Copyright M Cotter 2009
LANDSCAPES OF DECEPTION: A MULTI-MODAL EXPLORATION OF THE INDIGENOUS CULTURAL HERITAGE VALUES OF DECEPTION BAY, SOUTHEAST QUEENSLAND.

Maria Majella Cotter

Thesis submitted in fulfillment of the requirements of the degree of Doctor of Philosophy in the School of Environmental Science & Management Southern Cross University Lismore Australia

November 2009
Plate 1 Northern Deception Bay, southeast Queensland. Image taken from south Godwin Beach looking northeast towards Sandstone Point.

Plate 2 Scanning electron micrograph (x2000) of a sand grain obtained from the modern tidal flats of Northern Deception Bay. The surface of this grain is coated by amorphous silica to which several diatoms are adhered (scale bar = 50μm).
STATEMENT OF ORIGINALITY AND COMPLIANCE: I certify that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted, either whole or in part, for a degree at this or any other university. I acknowledge that I have read and understood the University’s rules, requirements, procedures and policy relating to my higher degree research award and to my thesis. **I certify that I have complied** with the rule, requirements, procedures and policy of the University (as they may be from time to time).

STATEMENT OF AUTHORSHIP: I hereby declare that this thesis contains both published and unpublished material which, in accordance with the terms outlined in the Southern Cross University Policy on Quality in Research Practice; I claim either sole or co-authorship. In Section 3.5.2 of this policy document it is stated that: “Where appropriate to the academic profession, discipline or field of research, authorship is ascribed to one or more of the following: (1) The conception and design of the research; (2) The collection, analysis and interpretation of data; and (3) the writing of the publication. An author’s role in a research output must be sufficient for that person to take public responsibility for at least that part of the output in that person’s area of expertise. No person who is an author, consistent with this definition, must be excluded as an author without his or her permission in writing. When there is more than one co-author of a research output, one co-author (by agreement amongst the authors) should be nominated as the executive author for the whole of the research output, and should take responsibility for record-keeping regarding the research output.” I certify that my contribution to every piece of written material presented in this thesis fulfils the criteria for authorship outlined above. At the start of each chapter I provide details of my contribution to its authorship and, where appropriate, acknowledge the contribution of all other co-authors.

Maria Majella Cotter
9 November 2009

Plate 3 Dead mangroves in tidal mudflats south Godwin Beach, Deception Bay.
ABSTRACT

In this thesis I use quantitative data from geoarchaeological analyses and qualitative observations and analyses derived from my own participatory activism to demonstrate and explore the multi-vocal landscape contexts of the Indigenous cultural heritage of northern Deception Bay, southeast Queensland. This exploration serves as a functional example of my efforts to create the nexus between positivist science, as geoarchaeology, and more humanist/social science forms of enquiry so as to better inform both theoretical archaeological studies and practical cultural heritage resource management.

The thesis is presented in two volumes. Volume I contains the substantive text of the thesis and it is divided into two sections. Section I is comprised of the published (and/or publicly presented and critiqued) elements of the quantitative geoarchaeological research; and includes published examples of my attempts to present this data into wider environmental management and planning forums. It documents the development and refinement of a palaeogeographic model for the Mid-to-Late Holocene evolution of the coastal environment of Deception Bay, and reflects on the local cultural heritage management implications of this model. Section II is comprised of published and/or public domain materials that are either the immediate consequences of my participant activism in court proceedings relating to threats to the Aboriginal archaeological heritage of Deception Bay or works derived from my later contemplation of this activism, and the socio-cultural contexts from which it emerged. Together these documents substantiate my contribution to the emerging engagement of cultural geography with natural resource management through the development of the notion of ‘cognitive ownership’ as a means of accommodation of multiple viewpoints and values in landscape.

Volume II contains a series of Appendices. Each Appendix is comprised of a technical report that contains detailed discussion of the methods and results of one or more of the multiple analytical techniques used to develop the palaeogeographic model described and refined in Section I of the thesis. These technical reports therefore are the critical evidentiary support that substantiates the geoarchaeological research described in the published works presented in Section I of Volume I.
ACKNOWLEDGEMENTS

At last a chance to publicly acknowledge all of the many people who have contributed to the development and completion of this thesis! My supervisor Associate Professor Bill Boyd of the School of Environmental Science & Management at Southern Cross University deserves my deepest gratitude for his support and encouragement. I remain most appreciative of Bill’s guidance and exemplary patience during the long and sometimes chaotic evolution of this thesis. Likewise I owe him special thanks for allowing me to work as his Research Assistant, during much of my early candidature both because of the financial assistance that this provided and because it has been an invaluable apprenticeship.

Dr Jay Hall of the Department of Anthropology and Sociology at the University of Queensland has, as a co-supervisor of this research, provided me with logistic support, access to Departmental research theses and generously shared his knowledge of the archaeology of the Moreton Region with me. In its most earliest stages Jay enthusiastically led me to recognize that the Melaleuca swamps typical of the coastal wallum communities of Moreton Bay were associated with archaeological deposits and thereby fostered my palynological research interests and enabled them to develop into the geoarchaeological research project that is the basis of this thesis.

Alex Bond, Gubbi Gubbi man and traditional owner of the Beachmere region is acknowledged for his willingness to show me his Country and for providing his perspective on the Indigenous cultural heritage of Deception Bay. Isobel Cooper and other residents of the Beachmere community especially the late John Goodman and the late Cyd Williams are thanked for their hospitality during this research and for allowing a stranger to consider the landscape of their backyard during a period when it was being contested at Court.

I am also sincerely grateful for the financial and technical support of the School of Environmental Science and Management at Southern Cross University and in particular acknowledge the encouragement of my research by both Professor Don Gartside and Professor Peter Saenger when they were each Head of School; and the many warm discussions held in the tearoom with the most recent Head of School, Dr Nick Holmes on issues both scientific and the more mundane. I think it also important to acknowledge that the multi-disciplinary nature of the School of Environmental Science and Management has meant that I have variously availed myself of the broader disciplinary expertise of past and present members of the School including Drs David McConchie and Malcolm Clarke (on issues geochemical), Alison Specht (on issues botanical, especially in relation to coastal wallum communities), Lee Sullivan and Richard Bush (on issues relating to coastal soils including acid sulphate occurrence) and Leon Zann (on issues marine including the movement and effect of the southeast Australian current and its likely effect on coral morbidity). The late Vicki Harriott deserves
special mention for her willingness to guide and mentor students from well-without her disciplinary focus, and her personal encouragement of me is here far too belatedly acknowledged.

Professor Peter Baverstock (retired Pro Vice Chancellor Research), as the driving force behind the establishment of the Graduate Research College at Southern Cross University, has worked hard to provide myself and other postgraduates the facilities and the environment to achieve academic success. ‘Bav’ to us all he and the dedicated staff around him (for the period of my research journey this has included Isa Rudgley, Judy Summers, Sonja Fether, Zoe Garbutt, Bonnie Mason and John Russell) have played an invaluable, and probably incalculable role in my research journey for which I will be forever appreciative.

A number of former and current technical support staff in the School of Environmental Science and Management at Southern Cross University also warrant my thanks and public acknowledgement for their patience, gentle advice and expert assistance with my laboratory and field research requirements including - in no particular order - Graham Lancaster, Kate Farrugia, Colleen Hanahan, John Arthur, Carla Howland, Barbara Harrison, Max Egan, Maxine Dawes, Roz Hagan, Russel Hasthorpe, Ken O’Brien, Peter Bligh Jones, Jenny Nolan, Nigel Raynard, Craig Taylor and Greg Luker. Another very special group of people whom I must acknowledge are the administrative support staff of the School including Kim Toussaint, Rosi Brown, Di Griffiths, Sonia Weiss and Delva Smith. I thank each of them for their many acts of kindness to me throughout my candidature as well as for their always obliging administrative assistance.

Less immediate to this research project but vital in my continuing with archaeological research was the encouragement and support given to me by Dr Wendy Beck of the School of Human and Environmental Studies at the University of New England. Her genuine enthusiasm for the study of plants in Australian archaeological research was inspirational in generating the initial ideas from which this thesis has developed. Moreover in my most recent work environment, Wendy has continued to be a gentle provider of encouragement for me to finish my thesis.

In acknowledging Wendy I must also express my sincere gratitude to a number of other colleagues who have provided practical and moral support during the evolution of this thesis. The first of these is Carol Lentfer who, as a fellow student, encouraged, supported and inspired my research efforts. Working along side Carol in the research laboratory made the tedium frequently more enjoyable, and the science more exacting for both of which I am forever grateful. Likewise, my firsthand observation of Carol’s determination and dedication to her research objectives, whatever the circumstances, forms an invaluable part of my doctoral research experience that I will forever admire and draw upon.
Equally the following members of an extended cohort of postgraduate students with whom I have shared candidature in the School of Environmental Science and Management are thanked for having (a) variously supplied me with friendship, meals, squash practice, intellectual debate, heated tearoom discussion, enthusiastic audiences for pre-conference delivery of research outputs and/or (b) shared office, boat, lab, car, field or housing space with me and/or (c) many other funny (and sad) experiences which have enriched both my research, and my life: Philippa Tolmie, Jo Wilson, Margaret Heslewood, Malcolm Clarke, Michelle and Richard Bush, Amanda Reichelt-Bruschett, Don Bruschett, David Rohweder, Peter Davies, James Pope, Martin Elphinstone; Nick Campbell, Darren Richardson, Jane Gardiner, Wendy Laird, Danny Bucher, Lisa Roberts, Graeme Esselmont, Jeff Parr, Sandy Gilmore, Sally Townley, Geoff Kerr, Jennita Gay, Angus Ferguson, Martin Gilmour, Dave Sharpe, Deb Perry and Roger McGrath (In acknowledging such a fine bunch I am forced to think that I should coordinate a reunion to thank you all in person!).

During the course of my research I have availed myself of the advice and skill of technical staff and facilities external to Southern Cross University including: David Price of the School of Geosciences at the University of Wollongong (re: Thermoluminescence dating of dune sands); Dr John Drennan and staff at the Centre for Microscopy and Microanalysis at the University of Queensland (re: scanning electron microscope analysis of grain shape analysis and laser particle size analysis) and Australian Nuclear Science and Technology Organisation at Lucas Heights (re: C14 AMS analysis of coastal sediments; AINSE Grants 93/130 & 94/189). Also, staff of the John Oxley Library, State Library of Queensland usefully assisted me in my historic researches and granted me permission to use images from the Historic Bancroft Collection in this thesis. Likewise the Fryer Library, University of Queensland is gratefully acknowledged for reproducing, from the original 1825 text, a photograph quality image of John Oxley’s map of Moreton Bay.

I am also grateful to the financial and practical research support provided to me by the Aboriginal and Torres Strait Islander Studies Unit, at the University of Queensland and its personnel especially Michael Williams, Ian Lilley and Sean Ulm in the context of my involvement with them in the Gooreng Gooreng Cultural Heritage Project. Sean, in particular, as a fellow researcher with a keen interest in the archaeology of southeast Queensland, has long been a valued discussant and critic of my research. Likewise I am grateful to Professor Iain Davidson of the School of Human and Environmental Studies at the University of New England for enabling me to have the opportunity to participate in the Gamilaraay Resource Use Project since this has provided me with an invaluable learning and research experience that continues to expand my appreciation of the nature and durability of Indigenous ecological knowledge systems. Iain has also been a valuable mentor and a gentle friend during the last four year period of intense personal distress and wider family loss. Such support has helped to maintain the academic process required for the completion of this work when at times it has seemed a task for which there was never going to be the space or time.
I also offer my sincere thanks to Robyn Bartel, Jane Gardiner, Colleen Hanahan, Barbara Rugendyke, Pam Watson and Sarah Watts. These women, along with Wendy Beck, form part of a courageous and inspirational ‘sisterhood’ that has throughout the course of my thesis consistently provided me with generous encouragement, compassionate support and wise counsel. I am in fact without words to express the gratitude and indebtedness I feel to each of these women since without both their individual encouragement and collective support I would not have found the courage to endure my most recent ‘life challenge’ let alone have found the courage to complete this thesis.

Nearing the end of a long list of people who have helped me achieve this thesis I wish to thank Stephen Cotter the one person who has most closely shared my research journey. My best friend and enduring love, Stephen I hope recognises that this thank you, however worded, will never be sufficient acknowledgement or recompense for the physical, emotional and intellectual support he has provided during the many phases of this research. Stephen has proven to be a competent digger of holes, carrier of dirt, wader of swamps and useful ladder for my sometimes forays up trees. He has laughed with me when I have ‘competently’ lost myself at my field site - during a rain event that fogged my glasses! - and argued with me when (and sometime when not) required. Most importantly he has shared with me life beyond this research thesis, and in doing so he has enriched me and provided a supportive space in which the sometimes impossible has become reality.

Finally, I wish to acknowledge the examination and review comments of Dr Nigel Chang, Professor Lesley Head, Associate Professor Shankar Sankaran and Associate Professor Laura-Jane Smith, reflection upon all of which, has contributed to the presentation of this thesis in its final form. Likewise the support and encouragement of Associate Professor Alison Specht in her role as Director of Post Graduate Studies and Research in the School of Environmental Science and Management at Southern Cross University has been invaluable during the submission and examination phases of this thesis. Alison, along with my supervisor Bill Boyd has demonstrated a sustained belief in me - as well as in my research - for which I will be forever grateful.
DEDICATION

This thesis is dedicated to the memory of my brother, Damien and my nephew, Adam ... two short lives that have long been my inspiration - and to my daughters Araluen and Elian who have helped to ground me in the here and now so as to accomplish it. They deserve its completion.
# TABLE OF CONTENTS

Abstract ............................................................................................................................................. V
Acknowledgements ............................................................................................................................ vii
Dedication .......................................................................................................................................... xi
Table of Contents ............................................................................................................................... ix
List of Figures ..................................................................................................................................... xiii
List of Plates ...................................................................................................................................... xv
List of Tables ....................................................................................................................................... xix
Thesis Prologue ................................................................................................................................. xxi
Thesis Explanation and Outline ........................................................................................................ xxvii

Volume 1 .............................................................................................................................................

SECTION 1

Science and Landscape: Towards a Geoarchaeological Understanding of the Indigenous Cultural Landscape of Deception Bay, Southeast Queensland

Introduction ........................................................................................................................................ 1

Chapter 1 Geoarchaeological research and the Moreton Region, southeast Queensland: Theory and context .......................................................................................................................... 9

Chapter 2 The application of geoarchaeological research principles and multi-disciplinary practice: A southeast Queensland case study

Holocene environmental change in Deception Bay, Southeast Queensland: A palaeogeographical contribution to MRAP Stage II .......................................................................................... 25

Chapter 3 The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland I

The Geomorphological context of Aboriginal cultural heritage places: A contribution to the proposed Beachmere (Extractive Industry) Development Control Plan ........................................................................ 41

Chapter 4 The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland II

Brisbane River and Moreton Bay Wastewater Management Study TASK HWQ 1.3: Historical changes in sediment types ................................................................................................................... 55

Chapter 5 The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland III

Long term vegetation change in the coastal wallum of north east New South Wales and southeast Queensland ................................................................................................................................. 75

Chapter 6 The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland IV

The Holocene coastal evolution of Deception Bay, southeast Queensland: implications for prehistoric cultural heritage management within Northern Moreton Bay ........................................................................ 89

Chapter 7 Refining and questioning the palaeogeographic model I

Radiocarbon and Thermoluminescence dating of Quaternary sediments in Deception Bay, southeast Queensland: Some Problems Encountered ........................................................................ 95

Chapter 8 Refining and questioning the palaeogeographic model II

The Late Quaternary stratigraphy of northern Deception Bay, southeast Queensland: Towards a sedimentary and geochronological framework ........................................................................ 107
Chapter 9 Section I: Research outcomes, wider implications and future directions

SECTION II

Deception, Contest and Meaning: Explorations of and Reflections on the Multi-vocality of the Indigenous Cultural Landscape of Deception Bay southeast Queensland

Introduction

Chapter 10 Contest and landscape I: The objection
The proposed Beachmere sand extraction site: A report to Caboolture Shire Council

Chapter 11 Contest and landscape II: The Court Appeal
The proposed Beachmere sand extraction site: A report to the Queensland Planning & Environment Court (With regard to archaeological and cultural heritage assessment issues associated with appeal No. 221 of 1995)

Chapter 12 Contest and landscape III: An analysis
Cognitive ownership of heritage places: Social construction and cultural heritage management

Chapter 13 The multi-vocality of landscape I: Otherness and marginalisation
Enculturing cultural heritage: The otherness of heritage and the marginalisation of its representation

Chapter 14 The multi-vocality of landscape II: ‘Disagreeable swamp’ or ‘Nourishing terrain?
The value of cultural heritage in marginal landscapes: A southeast Queensland case study

Chapter 15 The multi-vocality of landscape III: The contested cultural landscape of Deception Bay in wider contexts
“Rigidity and the changing order...disorder, degeneracy and daemonic repetition” Fluidity of cultural values and cultural heritage management

Chapter 16 Section II: Key findings, wider implications and future directions

Chapter 17 Thesis Overview

Thesis Epilogue

Volume I References
LIST OF FIGURES

Figure i A schematic diagram of the structural elements of landscape and the variable trajectories in space-time that manifest as place(s) in the present.

Figure ii The regional and sub-regional locales of focus in this study.

Figure 1.1 Archaeological site distribution and chronology in the coastal and offshore island zones of Moreton Bay southeast Queensland.

Figure 1.2 Archaeological site distribution and chronology in the subcoastal zone of the Moreton Region southeast Queensland.

Figure 1.3 Location map of the study area northern Deception Bay southeast Queensland (prepared by G. Luker, GIS laboratory Manager, Southern Cross University).

Figure 2.1 Location map of Deception Bay southeast Queensland.

Figure 2.2 The spatial relationship of present environmental features and Aboriginal cultural heritage items within northern Deception Bay.

Figure 2.3 Deception Bay shoreline c. 6000 BP.

Figure 2.4 Deception Bay shoreline c. 5200 BP.

Figure 2.5 Deception Bay shoreline c. 4600 BP.

Figure 2.6 Deception Bay shoreline c. 3500 BP.

Figure 2.7 Deception Bay shoreline c. 2500 BP.

Figure 2.8 Deception Bay shoreline at present.

Figure 4.1 The Holocene depositional environments of Moreton Bay (after Jones and Stephens 1981; Jones 1992).

Figure 4.2 Initial and current measures to assist navigation across the Brisbane Bar: (a) Improvements to the Brisbane River entrance from 1867 to 1912; (b) The present Brisbane River entrance depicting the 1987 bar cutting instigated to assist in the provision of a new port facility at Fishermans Island (after Dodson, 1990).

Figure 4.3 A comparison of the (a) pre-regulated Brisbane River c. 1860 and (b) the post regulated Brisbane river channel c. 1965.

Figure 5.1 Summary pollen diagram obtained from sediment core TP1, Ningi Swamp, northern Deception Bay, southeast Queensland.

Figure 7.1 The study area (courtesy Jay Hall, University of Queensland).

Figure 7.2 Geology Map of Northern Deception Bay, southeast Queensland (after Grimes et al, 1986). Note the extensive (but undifferentiated) Holocene beach ridge systems and the location upon these where material was sample for the thermoluminescence and/or radiocarbon age determinations.

Figure 7.3 Dune ridge profile, Wallace Road, Beachmere (Qhcb2 at 27°07'00" S 153°02'30" E). Note that the TL and Radiocarbon age determinations are not in stratigraphic context.

Figure 7.4 Above, a sand extraction facility operating within the quaternary sand ridge system of Deception Bay. Below, artefacts exposed through bulldozing of Qhcb2 sand units within this sand extraction area.

Figure 7.5 Scanning electron microphotographs of sand grains (212-250μm in size) obtained from two sedimentary sub-environments within northern Deception Bay. Note these sand grains were pre-
treated with HCl to remove carbonates, Calgon (sodium hexametaphosphate) to remove any clay coatings; and stannous chloride to remove any iron oxide coatings (cf. Bull, 1986) (all scale bars = 50μm). Image A: Sand grains from the modern tidal flats of Deception Bay. The grains are characterised by their sub-angular shape, smooth surfaces and the adherence of diatoms to their surfaces. The latter two features are associated with the precipitation of amorphous silica upon the surface of each sand grain. Image B: A sand grain from a depth of 85 cm below ground surface within the sedimentary profile of Wallace Road, Beachmere. In the top image note the rounded shape, abraded edges and dish-shape concavities apparent upon the surface of the sand grain. These features are reflective of Aeolian transportation of sand. In the bottom image note the significant solution pitting of the grain surface. This is indicative of rapid and/or persistent in situ chemical weathering of sand grains.

**Figure 7.6.** Left, an SEM photomicrograph of an untreated sand grain from Wallace Road, Beachmere. The presence of a clay (note elevated Al) and/or iron (Fe) oxide coating on the grain is confirmed by the EDAX microprobe analysis graph of this grain shown at Right. Richard Bush and Stephen Cotter assisted with these SEM and microprobe analyses.

**Figure 8.1** A Location map of the study area, south east Queensland, Australia (courtesy, Greg Luker, Southern Cross University).

**Figure 8.2** The location of all sediment cores analysed in this study.

**Figure 8.3** Environmental envelopes highlighting the distinction between a dune ridge encountered within Ningi Swamp and the samples obtained from a location along an extensive dune ridge near, Wallace Road, Beachmere.

**Figure 8.4** Environmental envelopes showing the distinction between the foredune systems of southeast Bribie Island and the channel sands of Pumicestone Passage.

**Figure 8.5** Grain Shape summary diagram for: solid bars - Ningi Swamp, hatched bars - Wallace Road (at c. 100 cm depth) open bars - Wallace Road (at c. 220cm depth).

**Figure 8.6** Grain shape summary diagram for: solid bars – Pumicestone Passage, hatched bars - Deception Bay, open bars - Skirmish Point.

**Figure 9.1.** A summary diagram of the Palaeogeographic model developed to explain the Mid-to-Late Holocene coastal evolution of northern Deception Bay. Key features of this model include variations in sea-level and/or tidal regime with the intermittent but repeated development of tidal lagoon features within a primarily progradational sedimentary environmental period.

**Figure 10.1** Land use patterns for the Ningi Area, Toorbul Peninsula, Deception Bay Southeast Queensland.

**Figure 10.2** 1994 Land use patterns for the research study area, Ningi, Deception bay southeast Queensland.

**Figure 10.3** Land & vegetation profile of the Melaleuca wetland located due south of the Toorbul Point Bora Rings, Bestmann Road, Ningi, Southeast Queensland.

**Figure 10.4** Bulldozed land surface at the north western perimeter of Bribie Industrial sands, November 1993.

**Figure 10.5** Artefactual material eroding out of the exposed sands pictured in Figure 10.4.

**Figure 10.6** Additional Artefactual material eroding out of the exposed sands depicted in Figure 10.4.

**Figure 10.7** Pioneer Sands, Ningi, January 1993. This northeasterly facing photograph depicts and artifact scatter (shell material and charcoal can be seen in the foreground) in close proximity to sand extraction operations.

**Figure 10.8** Pioneer Sands, Ningi August 1993. Two south westerly facing photographs depicting the same are as Figure 10.5; although it is now completely bulldozed. Note that the surface material has

xvi
been heaped to one side (visible on the bottom right).

**Figure 10.9** Pioneer Sands, Ningi, March 1994. This north easterly facing photograph indicates that further sand removal has occurred since the original bulldozing episode (cf. Figure 10.5). Note that the heaped material from the original bulldozing event is visible to the left hand side of the dirt track, and also note that it is now vegetated with colonizing weed species.

**Figure 10.10** This photograph depicts the artefacts found eroding out of the heaped sand piles noted in Figure 10.7.

**Figure 10.11** This photograph depicts one face of a test pit associated with the artefact scatter shown in Figures 10.5 to 10.8. Shell material occurs at depth, firmly bound in a baked clay matrix suggestive of an ovenpit.

**Figure 10.12** A 1958 aerial photograph of the study area. This photograph clearly indicates that no pine plantations were established on Lots 162 & 163 at this time (cf. Figure 10.13). Aerial Photograph: REDCLIFFE RUN 4 Q769-20, 16.5.1958 Source, Department of Natural Resources, Sunmap Centre, Woollongabba Qld.

**Figure 10.13** A 1972 aerial photograph of the study area clearly showing that Lots 162 and 163 are at this time planted to pine. Aerial Photograph: BRISBANE I-IV Run 3 Q2566 1-7-1972. Source, Department of Natural Resources, Sunmap Centre, Woollongabba Qld.

**Figure 10.14** A 1991 aerial photograph of the study area showing evidence of southwest-northwest tending sand dune systems deposited at differing sea-level stillstands. Aerial photograph: Caboolture 9443 Q4952 Run 3 083 117-6-1991. Source, Department of Natural Resources, Sunmap Centre, Woolloongabba Qld.

**Figure 10.15** The result of a survey of Zone A of Lot 163, Beachmere. Note that the windrows are superimposed on the pre-existing microtopography, and that the midden precinct in part lies on a sand ridge between two windrows.

**Figure 10.16** Geological map of the Toorbul Peninsula indicating the presence of marine deposits between parallel dune systems.

**Figure 11.1** Location of proposed sand extraction site.

**Figure 11.2** Bulldozed land surface at the north western perimeter of Bribie Industrial sands.

**Figure 11.3** Artefactual material eroding out of the exposed sands featured in Figure 11.2.

**Figure 11.4** Additional artefactual material eroding out of the exposed sands featured in Figure 11.2.

**Figure 11.5** Pioneer Sands, Ningi, January 1993. This northeasterly facing photograph depicts and artefact scatter (shell material and charcoal can be seen in the foreground) in close proximity to sand extraction operations.

**Figure 11.6** Pioneer Sands, Ningi, August 1993. Two south westerly facing photographs depicting the same are as Figure 11.5; although it is now completely bulldozed. Note that the surface material has been heaped to one side (visible on the bottom right).

**Figure 11.7** Pioneer Sands, Ningi, March 1994. This north easterly facing photograph indicates that further sand removal has occurred since the original bulldozing episode (cf. Figure 11.5). Note that the heaped material from the original bulldozing event is visible to the left hand side of the dirt track, and also note that it is now vegetated with colonising weed species.

**Figure 11.8** This photograph depicts the artefacts found eroding out of the heaped sand piles noted in Figure 11.7.

**Figure 11.9** This photograph depicts one face of a test pit associated with the artefact scatter shown in Figures 11.5 to 11.8. Shell material occurs at depth, firmly bound in a baked clay matrix suggestive of an ovenpit.
Figure 12.1 The location of the study area. Note in the original publication, a composite figure identifying the location of all 4 case studies was included. For clarity in this abridged presentation of the published work the original figure is replaced to indicate the location of the Beachmere Case study only.

Figure 12.2 The Beachmere midden complex illustrating the distribution of sites in relation to cadastral boundaries. M12 denotes the midden which has become one focus of a Planning & Environment Court dispute (Image courtesy Dr Jay Hall, Department of Anthropology and Sociology, University of Queensland).

Figure 12.3 The primary parties in the Beachmere midden complex (after Colley, 1995).

Figure 12.4 The specific parties in the Beachmere midden complex. This figure is not exhaustive but identifies the principal groups and individuals with a claim to association with this cultural heritage site. Key to abbreviations: ATSIC = Aboriginal and Torres Strait Islander Commission; AHC = Australian Heritage Commission; ACDO = Australian Cultural Development Office; ANCA = Australian Nature Conservation Commission; DEH = Department of Environment and Heritage; DM&E = Department of Minerals and Energy; DLG&PL = Department of Local Government and Planning; DAIA = Department of Aboriginal and Islander Affairs; DMR&T = Department of Main Roads & Transport; SCU = Southern Cross University, Lismore, NSW; UQ = University of Queensland, Brisbane, Qld; (MRAP) = Moreton Region Archaeological Project.

Figure 12.5 The linkages between and within some of the specific groups with party interests in the Beachmere midden. This figure particularly emphasises the complexity of existing links between indigenous cultural groups claiming association with the midden. It also reflects the links between archaeological research, management and the expression of 'cognitive ownership' by community groups.

Figure 12.6 This figure indicates that claims to association with a cultural heritage site may directly result from economic interests and legislative process. The legislative requirement to produce an EIS for a development proposal makes, as in the case of the Beachmere midden, cultural heritage sites an economic consideration for the developer and contracted cultural heritage consultants. These claims to association potentially influence, or are themselves influenced by, the 'cognitive ownership' rights of indigenous groups and public servants such as the Regional Archaeologist and Local Government planning officers.

Figure 12.7 In this figure the central responsibility for the management of cultural heritage sites, which for the Beachmere midden is vested in the role of the Regional Archaeologist, is depicted.

Figure 14.1 Location map of the study area (prepared by Greg Luker, Southern Cross University).

Figure 14.2 Cadastral Boundaries, land-use and land-cover units for the study area c. 1987 highlighting areas planted to pine and the cadastral boundaries of Lots 162 & 163 Beachmere.

Figure 14.3 John Oxley’s plan for the Brisbane River as it appeared in Geographical Memoirs on New South Wales Field (1825). Note annotation of “low woody land” for the ‘Toorbal’ Peninsula area in the inset portion of the plan. Original image courtesy of the Fryer Library, University of Queensland.

Figure 14.4 Photograph of Aboriginal groups Sandgate, north Brisbane. 1890, Moreton Bay ca: 1894. Note the paperbark huts and the Melaleuca swamps in the background. From the Bancroft Collection., photograph (negative19878) courtesy of the John Oxley Library, Brisbane, Queensland.

Figure 14.5 Photograph of Aboriginal groups Stradbroke Island, Moreton Bay ca: 1894. Note the paperbark huts and the Melaleuca swamps in the background. From the Bancroft Collection., photograph (negative 62940) courtesy of the John Oxley Library, Brisbane, Queensland.

Figure 14.6 The location of known Indigenous archaeological places within northern Deception Bay (after Hall with Cotter, 1996).

Figure 14.7 Photograph of Lots 162 & 163 taken in 1994 subsequent to pine plantation removal. Note the weeds, burnt stumps and general lack of aesthetic or environmental appeal of the Place.
LIST OF PLATES

Plate 1 Northern Deception Bay, southeast Queensland. Image taken from south Godwin Beach looking northeast towards Sandstone Point. i

Plate 2 Scanning electron micrograph (x2000) of a sand grain obtained from the modern tidal flats of Northern Deception Bay. The surface of this grain is coated by amorphous silica to which several diatoms are adhered (scale bar = 50μm). i

Plate 3 Dead mangroves in tidal mudflats south Godwin Beach, Deception Bay. ii

Plate 4 Sediment sampling in Bayside Drive Lagoon, Beachmere, northern Deception Bay. +xxxix

Plate 5 The author conducting fossil pollen extraction on sediments obtained from Deception Bay, using chemical methods 1

Plate 6 A local fisherman tries his luck during high tide at Godwin Beach. In this image the flat coastal plain of Deception Bay stretches out from the shallows of Godwin Beach towards Redcliffe Peninsular in the southeast horizon. 7

Plate 7 Harvested Pinus Elliottii plantation, adjacent to southern boundary of a large Melaleuca quinquenervia swamp that was the subject of topographic survey for this thesis. The clearing of these pine trees revealed a midden precinct that was the subject of court proceedings in the Queensland Planning & Environment Court in 1995. +126

Plate 8 Two separate views of the same location, south Godwin Beach Deception Bay. In the top image two Avicennia marina mangroves are emergent at high-tide in a low energy coastal setting. The image presents a natural environment not immediately affected by human influences. In the bottom image, changes in the view as accomplished by the adjustment of the zoom lens of a camera, and a brief elapse of time, reveals the same landscape to be subject to human influences both in terms of the concreting of the foreshore, and as a location for recreational sailing. These images serve as an example of the fact that the vantage point of the observer is critical to the evaluation of landscapes, especially in the determination of the nature and context of cultural landscapes; and in the assessment and/or recognition of the multi-vocal nature of such landscapes. 127

Plate 9 North Godwin Beach, Deception Bay, southeast Queensland. My husband Stephen and youngest daughter Elian sit on a seat looking across Deception Bay towards Redcliffe in the south. Beside them is a stone monument to Charles Godwin, a pioneer of fish cannery works in Deception By and Pumicestone Passage after whom the beach is named. From the contemporary seating to the stone monument the outward gaze here is one in which only the European heritage of this place is readily discerned. 134

Plate 10 Elian with cicada, Spring 2007. 282

LIST OF TABLES

Table 1.1 Dated evidence for Mid Holocene sea level, Moreton Bay southeast Queensland 20

Table 2.1 Summary of evidence used to model the Holocene coastal evolution of northern Deception Bay, southeast Queensland 38

Table 4.1 Dated evidence for Holocene sea level within Moreton Bay 60

Table 7.1 C14 Radiometric data obtained from various materials sampled within the coastal plain of northern Deception Bay. 99
Let no one say the past is dead.
The past is all about us and within.
Haunted by tribal memories, I know
This little now, this accidental present
Is not the all of me, whose long making
Is so much of the past

(Walker, 1966:2)

INTRODUCTION
In the first stanza of the poem The Past, the late Aboriginal Australian poet Oodgeroo of the Tribe Noonuccal, eloquently interconnects her present with her genealogical and mythological heritages. The achievement of such interconnection is consistent with the viewpoint expressed by Rumsey (1994) that history and myth are not mutually exclusive but rather they are a linked means of dealing with the past which can easily coexist. To illustrate his point Rumsey emphasised the centrality of landscape to both the myth and history of Aboriginal Australians. In particular he highlighted that for Aboriginal Australians landscape is the locus of social memory such that stories, songs, dance and paintings are all means of retrieving meanings from Country and, paradoxically, help to combine extreme and long-term continuity with considerable negotiability (Rumsey, 1994). In this manner Oodgeroo’s poem functions to reinforce her story, her Aboriginal heritage; and indeed re-positions it in the context of Western literary tradition.

That such a re-positioning is possible derives from the universality of the concepts of time and place. As Jolly in her exploration of the gendered nature of mythological narratives from South Pentecost, Vanuatu expresses it:

Our languages of time and place frequently articulate. Both in the idiolect of theoretical physics and everyday talk in English, there is a condensation of the temporal and the spatial. This ‘talking together’ of time and place is apparent in many languages other than English and there is reason to believe that this might represent a universal propensity in human thought (Jolly, 1999:282).

Of fundamental importance to this ‘talking together’ of time and place are the linkages between the spatial values of fixity and fluidity, and the temporal values of persistence and transience (Jolly 1999). For example, the topography of garden sites is crucial in the everyday arts of memory for speakers of the Sa language from South Pentecost. Thus in recalling the age of someone, or a past event, it is usual for these people to mark time by marking space with phrases such as “that was the year that we made our taro gardens at Lon Butua” (Jolly, 1999:284). Consequently past events and the memories of ancestral trajectories are traced on the ground although these places are frequently reconstituted and recreated by the movements of the living and their practices of cultivating some places and not others.
This ‘interanimation’ (Basso, 1996) - or constant mutual molding - of the gardens on South Pentecost reflects the notion that like all human realities, landscapes have a plurality of coda by which they may be interpreted (Parcero Oubiña et al., 1998; Ashmore & Knapp, 1999).

Oodgeroo by stating that ‘The past is all about us and within’, cogently reminds us that each individual separately and uniquely brings to the present an inherited, an experiential and a perceptual heritage and that this occurs in a space - a locale - that is ‘all about us’. Moreton Bay or “Quandamooka” is a southeast Queensland locale of central importance to Oodgeroo Noonuccal about and within which her cultural identity has been framed (Noonuccal, 1990). Stradbroke Island or “Minjerribah”, an island within Moreton Bay, is central to the creation and affirmation of her cultural identity. This centrality relates to the following interconnecting elements of her genealogical, mythological and experiential heritage:

- Stradbroke Island is one of three of the outer barrier islands Moreton Bay and the tribal custodians of this Island are members of the Noonuccal clan with whom, through patrilineal descent, Oodgeroo has direct ancestry (Oodgeroo, 1990b; Cochrane, 1994).

- The name Oodgeroo, which means ‘paperbark tree’ is one the author adopted to both reflect her position as an Aboriginal authoress and her traditional affiliation with the paperbark swamps that are ubiquitous to the coastal lowlands of Stradbroke Island and greater Moreton Bay (Noonuccal, 1990b).

- The adoption of the name Oodgeroo in 1988 was in effect a political protest coincident as it was with ceremonies to commemorate the ‘Bicentenary of Australia’ and thereby may also be seen to reflect elements of her contemporary social and political experience (Cochrane, 1994).

- Upon her death in 1993, and in accordance with her wishes, Oodgeroo was buried on Minjerribah - the domain of her Noonuccal clan (Cochrane, 1994).

These elements suggest that Minjerribah-Stradbroke Island was (and is) a locale with a plurality of coda, through which cultural identity can be described, interpreted and (re)negotiated. Thus, for example, in the sense that Jolly (1999) describes, the fixity of paperbark swamps in the regional locale of Moreton Bay (and the particular locale of Stradbroke Island) is used to interpret and negotiate the fluidity of Oodgeroo Noonuccal’s political struggle, and her development as an Aboriginal authoress and advocate for the people and landscape of her birth (e.g. Oodgeroo, 1990). The example also alerts us to the inherent complexities of time-place relationships in shaping present cultural heritages. This is especially so where the “talking together” of such concepts may have a further dimension: as when it is related to an archaeological heritage subject to contemporary social and political contestation. In this
sense Oodgeroo affirms that “Archaeology is a contemporary practice” (Bender et al., 1997:150). It is the experiences we have of the traces of the past today, and our contemporary social shaping of these accounts that contribute to ‘the little now’; and hence to our understanding and evocation of meaning from such evidence. As Gosden & Lock (1998) express it, human action is ‘context specific’, and consequently landscape and material culture are not merely the stage setting for such action but creative of the locales integral to that action.

Thus, just as the linkages between the spatial values of fixity and fluidity, and the temporal values of persistence and transience are critical to understanding contemporary societies, and their unique cultural landscapes, such linkages are at the crux of understanding the archaeological record. As relational entities, space and time are necessarily both the outcome and the medium of social action (Gosden & Head, 1994), and hence the production [and demarcation] of space, through such social action, can be considered to constitute the making of history, and ultimately, prehistory². The term landscape thus considered is - in Jolly’s (1999) framework - the vehicle through which the multivocality of the universal concepts of time and place is best articulated. In such an articulation each notional place can be seen to be comprised of several different landscape elements (e.g. perceptual, social, natural, cultural; and archaeological) and when revealed in the present these landscape elements can be recognised to have had unique trajectories through time (Figure i).

In this scenario it can be seen that one of the composite derivatives of the unique trajectories of landscape elements that may manifest in the present is the ‘archaeological record’. Hence at the most fundamental level it is through the examination and analysis of the composite space-time trajectories of landscape elements revealed in the present that we derive understanding about the archaeological record. As Gosden & Lock (1998) cogently state, all prehistoric societies oriented their actions in the present with the past in mind and therefore the task for archaeologists is to understand the sorts of histories at work in different periods. In this framework archaeological sites are recognised to be constructed places which reflect the interplay of cognitive, social and real world environmental forces both as they were manifest in the prehistoric past and as they are manifest in the present. In essence therefore archaeological places are the product of (a) the prehistoric inhabitant's construction of place, itself a composite of prehistoric cognition and real world phenomena; (b) the subsequent trajectory of this place in time and space; and finally (c) the archaeologist's construction of this place in the present.

² It is pertinent to note that the appropriateness or otherwise of the use of the terms ‘prehistoric’ and ‘prehistoric’ in descriptions of Australian archaeological research - given the sometimes pejorative connotations of these terms for Indigenous Australians - has been the subject of, at times, acrimonious debate in the recent literature (e.g. Dortch 1998; Smith, C. 1998; Burney 1999; Galt–Smith 1999; Langton & Megaw 1999; Smith, P. 1999; Thorley & Mulvaney 1999). The debate is noteworthy for its diversity such that no consensus of opinion as to the continuance or discontinuance of the use of these terms (e.g. on the basis of intellectual tradition, racial affiliation and/or gender) can be recognised - although there is general agreement that the appropriateness of language is context dependent. Thus, in the context of this thesis, where either directly quoting or paraphrasing the work of other authors the terms ‘prehistory’ and ‘prehistoric’ will be used as in the original text; and with an acceptance that these terms have been used only to refer, in the strict definitional sense, to a period antecedent to writing’(Langton & Megaw, 1999). Indeed within this thesis the meaning of all occurrences of these terms should be read as being confined to this strict definition. Where in respect to particular cultural heritage items and places of value to contemporary Aboriginal communities specificity is required, use of the terms prehistory and prehistoric is avoided and, where necessary, explanation of substituted terms is made in the text.
as influenced by real world environmental phenomena and the personal, theoretical and methodological biases of the particular archaeologist.

THIS ACCIDENTAL PRESENT

...People’s sense of place, and their engagement with the world around them, are invariably dependent on their own social cultural and historical situations. (Ashmore & Knapp, 1999:20-21).

In the year of Oodgeroo Noonuncal’s death, a play entitled ‘One Woman’s Song’ depicting her earlier life performed to packed houses at the Cremorne Theatre, in Brisbane. I attended this critically acclaimed show in which Oodgeroo at times throughout the play’s season had made a cameo appearance. Unfortunately by the time I attended Oodgeroo had already become too ill to participate. This was in 1993, poignantly the United Nation’s Year of Indigenous peoples and barely for a moment my present and hers interconnected.

Beyond this immediate interconnection the focus of this thesis is within the locale familiar to Oodgeroo Noonuccal and of and about elements of her broad Aboriginal ancestral heritage. Specifically this thesis focuses on the regional locale of Moreton Bay, southeast Queensland, and considers some of the linkages between time and place as these relate to the noted differential formation, preservation and current visibility of elements of the Aboriginal archaeological heritage of this region. The scale of analysis is at the sub-regional level with the analysis being directed at northern Deception Bay (Figure ii) - a coastal plain at the northwest margins of the greater Moreton
Bay - and the comprehensive investigation of the Aboriginal archaeological heritage of this coastal plain. In examining the interconnections of time and place as they have manifest in the Aboriginal heritage resources of northern Deception Bay, the thesis moves beyond documentation and assessment of the archaeological record, to consider much that is in ‘this accidental present’, and as will be shown it does so with recourse to the ‘usefully ambiguous’ [Gosden & Head, 1994] notion of landscape.

Figure ii: The regional and sub-regional locales of focus in this study.
THESIS EXPLANATION

INTRODUCTION

This thesis explores the conjuncts between the universal concepts of time and space, particularly where these conjuctions are encapsulated as place; and the explication of such ‘places’ within the broad parameters offered by the multi-layered and dynamic notion of landscape. It does so in the context of a practical research programme focused on the investigation of the Indigenous cultural heritage of northern Deception Bay, southeast Queensland - a heritage that throughout the course of this research has been under increasing threat from urban population growth and concomitant urban, rural residential and light industrial pressures (Tarte, 1993; Neil, 1998; Stephens, 2003; Holmes et al., 2006). As originally conceived, this research, set firmly within the context of the Moreton Region Archaeological Project (Hall & Hiscock, 1988), was focused on the adoption of a landscape approach (sensu Rossignol, 1992; Feinman, 1999; Fisher & Thurston, 1999; Anschuertz et al.; 2001) and the application of environmental and/or geoarchaeological principles and practice (e.g. Shackley, 1981; Keeley, 1984; Hudak, 1993; Brown, 1997; Rapp & Hill, 1998; Dincauze, 2000; Branch et al., 2005; Goldberg & Macphail, 2006) as a means to address explicit questions raised by prior archaeological investigations within the region. In the emergent context of a real threat to elements of the Aboriginal cultural heritage resources of northern Deception Bay, my participant ‘activism’ (sensu Maxey, 1999) in court proceedings surrounding a parcel of land subject to proposed development for sand extraction caused me to extend consideration of the environmental history and archaeology of the region into the sphere of contemporary social and cultural politics, particularly as these coalesce as elements of environmental management.

This extension has coincided with the development of a body of conceptual and practical literature in the field of cultural geography and archaeology, especially where influenced by feminist standpoint theory (Haraway, 1988; Harding, 1991), that has sought to expand the social relevance of science based research, and demanded a more self-reflexive consideration of positivist science approaches (Shapin, 1998; Madge & Bee 1999; Head, 2000a 2000b; Gill, 2006; Waitt et al., 2006). Drawing on the poetry of Oodgeroo Noonuccal, as presented in the prologue to this thesis, I use the phrase ‘this accidental present’ as a referential metaphor to describe and reflect the context and action of this research; and to acknowledge the ‘situatedness’ of the knowledge (after Haraway, 1988) that has both informed and developed from it. The research sits as a functional example of my efforts to create the nexus between positivist science, as geoarchaeology, and more humanist / social science forms of enquiry through an analysis of the social construction of Indigenous heritage within the landscape of Deception Bay. This latter form of enquiry derives directly out of the repositioning of my research from a critical science based analysis of archaeological landscapes, to the exploration of the ‘contemporary practice’ of archaeology in the context of environmental management and contested terrain. This repositioning falls into the net of ‘accidental presents’ since although my incorporation of
the constructionist analyses enabled by cultural geography into my research suggests at least an acceptance of the basic frameworks of such research, had the Indigenous archaeology I was investigating not been subject to such immediate threat and challenge, it is unlikely that my ‘activism’ would have arisen, and my thesis would have been destined to be a conventional geoarchaeological (science) based explication of the Aboriginal archaeology of Deception Bay. It is both more and less.

One of the critical tensions in the construction of this thesis, particularly as it in part falls within the ‘borderlands’ of the nature/culture divide, has in fact been to provide the evidentiary support for the geoarchaeological research outcomes reported – since it is not just science but ‘good science’ (i.e. the valid collection and analysis of empirical data) that is required for validation of such outcomes – whilst allowing sufficient space for the exploration of cultural and critical geographies so as to negotiate the realm of archaeology as ‘contemporary practice’. I have attempted to mediate this tension by: (a) formatting the thesis into two sections, as outlined below; (b) placing the methodological discussions and evidentiary support for the geoarchaeological research in the appendices and; (c) by flexibly framing the research to meet both the original [primarily geoarchaeological] and emergent [primarily socio-cultural] aims so that the focus of the work from a coherent geoarchaeological study, to a more diffuse engagement with the environmental management system could be effected. This relative pragmatism, serves to take on the challenge recently posed by Head (2000b) in the preface of her book exploring the nexus between cultural landscapes and environmental change:

...The lines between culture and nature, science and the humanities, people and their environment, north and south are as problematic and shifting as the continental edge from which I write. Our challenge is not to ink in the lines but to use the tensions creatively to see more clearly where we stand in space and time (Head, 2000b: xxii)[emphasis added].

Ultimately, and in the context of the ‘multiple accidental presents’ that have converged to effect this research, the target is to better understand the time-place relationships implicit in cultural heritage in general, and suspected for the Indigenous heritage of Deception Bay in particular, so as to inform both theoretical studies and practical cultural heritage resource management.

**RESEARCH AIMS**

As outlined above, the flow of my research has not been linear such that whilst the original study had a single aim the work has evolved to encompass three research aims, and an overarching theme of self-reflexive critique of the research and its socio-political contexts.

**Aim 1 (the original study aim):** To use geoarchaeological principles and practice to reconstruct past environments of the Deception Bay area, especially those of the Holocene period (10,000 years BP to the present), and to relate these to the formation and preservation of the present archaeological record
of northern Deception Bay, southeast Queensland. To achieve this aim the following objectives were identified:

**Objective 1.** To determine the Late Quaternary/Holocene shoreline and coastal plain history of northern Deception Bay.

**Objective 2.** To determine a Late Quaternary vegetation history for northern Deception Bay.

**Objective 3.** To produce a model of the Late Quaternary environmental conditions and change in the study area.

**Objective 4.** To critique the model of environmental change against the archaeological record of Deception Bay, and the broader archaeological and environmental record of the wider Moreton Region of southeast Queensland.

**Aim 2 (emergent aim):** To integrate the geoarchaeological evidence for, and understanding of, the landscape of Deception Bay into contemporary environmental and cultural heritage management processes. To achieve this aim the following objectives were identified.

**Objective 5.** To present the geoarchaeological research in terms compatible with and applicable to environmental and cultural heritage management forums and state government processes within Queensland.

**Aim 3 (emergent aim):** To explore the historic and contemporary socio-political contexts of the Aboriginal cultural heritage resources of northern Deception Bay.

**Objective 6.** To document and analyse the historic and contemporary social, political (and geoarchaeological) contexts of threatened elements of the Aboriginal cultural resources of northern Deception Bay.

**RESEARCH DESIGN**

The acknowledgement and use of terms such as flexible, non-linear, multi-modal, emergent, and self-reflexive in the articulation of this research and its aims is purposeful and deliberate. Unified by a focus on the ‘usefully ambiguous’ (*sensu* Gosden & Head, 1994) and ‘multi-vocal’ (*sensu* Jolly, 1999) notion of landscape – a notion that allows the ready observation of the interplay (and recursive link) between nature and culture (Fisher & Thurston, 1999; Fry, 2001) – these terms are used to describe the key elements and/or functional outcomes of the context and locale - specific negotiation of knowledge(s) that underpins this research. The epistemological framework adopted in this thesis inclusive of (a) its use of multiple methodologies drawn from both the natural and social sciences, (b)
its engagement with and response to ‘life world’ challenges in environmental and cultural heritage management and (c) its focus on functional and applied outcomes finds validity and expression in the developing theory and emergent praxis of transdisciplinary research (Somerville & Rapport, 2000; Wickson, et al., 2006; Hirsch Hadorn et al., 2008a,b; Pohl & Hirsch Hadorn, 2008; Pohl, 2008; Russell, et al., 2008).

At a most fundamental level transdisciplinary research is research that in its approach transgresses both the boundaries between academic disciplines and the boundaries between academic research and practice (Hollaender, et al., 2008). In the following I briefly outline the three characteristics of problem focus, evolving methodology and collaboration that are considered to be the distinguishing features of a transdisciplinary research enterprise:

**Characteristic 1: Problem focus**
Transdisciplinary research is focused to solve complex, multi-dimensional problems, particularly problems that involve an interface of human and natural systems (Wickson et al., 2006). It is further characterised by a willingness to engage in societal or ‘life world’ problems and an ability to recognise and take into account the heterogeneous nature of disciplinary and stakeholder perceptions of such problems (Wickson et al., 2006; Pohl & Hirsch Hordan, 2008; Russell, et al., 2008).

**Characteristic 2: Evolving Methodology**
Transdisciplinary research is without a single, prescribed methodology (Wickson et al., 2006). Methodological development is characterised by the iterative and reflective interpenetration of epistemologies such that dissolution of disciplinary boundaries is seen as a necessary construct for the development of novel or unique (evolved) methodologies tailored to the problem and its context (Wickson et al., 2006; Russell, et al., 2008).

**Characteristic 3: Collaboration**
Transdisciplinary research is focused on collaborative knowledge generation between researchers and stakeholders. The distinguishing feature is not simply collaboration between researchers from different disciplines but also with the community, a form of collaboration that allows the possibility for a lone researcher to adopt a transdisciplinary approach (Wickson et al, 2006). Key to this type of collaboration is the ability of the individual to fuse (or integrate) knowledge from a number of different disciplines and engage with community stakeholders in the process of generating knowledge(s) (Wickson et al., 2006; Kueffer, et al., 2007; Russell, et al., 2008; Pohl, et al., 2008).

As both the functional record and exploratory outcome of my efforts to use transdisciplinary research to create the nexus between positivist science, as geoarchaeology, and more humanist/social science forms of enquiry through the analysis of the social construction of Indigenous heritage the thesis is
presented as an emergent text rather than as a single integrated submission with a central argument. Yet, as emphasised above, it is afforded a unity of purpose and action by its single focus on the complex and multi-dimensional landscape of Deception Bay, and by the primacy of my role in undertaking all of the methodological analyses (both quantitative and qualitative) used to investigate this multi-vocal landscape. In this context the transdisciplinary approach adopted reflects an intuitive and iterative research response to the intrinsic complexity of human and environment interactions observable at this locale-specific landscape level, a complexity that to fully explicate necessarily has required the use and integration of multiple modes of enquiry.

**THESIS ORGANISATION**

This thesis is neither a conventional dissertation nor simply a collection of published papers presented as a body of research. For both the pragmatic, and epistemological reasons noted above it is an amalgam of the two and thus most fully can be seen as both the documentation and exploration of a researchable question, and as a self-reflexive evaluation of the theoretical and practical contributions this research has made. Most fundamentally it is the documentation and outcome of a research apprenticeship and, as such, fits comfortably within the gamut of emerging variants of the traditional Doctoral thesis (Park, 2005).

The format of the thesis follows the progression of my investigations of the Indigenous cultural landscape of Deception Bay from those originally grounded and fixed within the physical ‘quantitative’ sciences, to those emergent out of my participant activism and hence most aptly described as qualitative and situated within the disciplinary realms of cultural and critical geographies. It is presented in two volumes. Volume I contains the substantive text of the thesis and it is divided into two sections. Section I is comprised of the published (and/or publicly presented and critiqued) elements of the geoarchaeological research; and includes published examples of my attempts to present this data into wider environmental management and planning forums. The second section is comprised of published and/or public domain materials that are either the immediate consequences of my participant activism in court proceedings or works derived from my later contemplation of this activism, and the socio-cultural contexts from which it emerged. Volume II is comprised of a series of Appendices that substantiate the geoarchaeological research presented in Section I of Volume I. The outline of the thesis follows.

**THESIS OUTLINE**

**VOLUME I**

**Thesis prologue: This accidental present.**

The prologue introduces some of the overarching theoretical conceptualisations of time, space and landscape that serve to link seemingly disparate elements of this thesis into a coherent whole. It
enunciates and elaborates the ‘accidental present’ as a referential metaphor and thereby provides context for the researcher and the researched.

SECTION I
Science and landscape: Towards a geoarchaeological understanding of the Indigenous cultural landscape of Deception Bay, Southeast Queensland.

Introduction
Section I is comprised of nine chapters. The introduction to Section I provides a brief summary of each chapter including, where necessary, commentary on the genesis and content of each, particularly within the context of the development of a geoarchaeological understanding of northern Deception Bay. At the conclusion of the introduction an extended list of all other publications derived from and/or related to the geoarchaeological research described to which I have made a contribution is provided. The individual chapters comprising Section I are listed below.

Chapter 1 Geoarchaeological research and the Moreton Region, southeast Queensland: Theory and context. (unpublished)
This chapter provides an overview of the aims and outcomes of the Moreton Region Archaeological Project and points towards a need for reliable environmental data, derived from within an archaeological research paradigm, for the long term substantiation of explanatory models for prehistoric human occupation of this region, particularly during the Holocene. In doing so it provides the framework and context for the geoarchaeological examination of northern Deception Bay as reported in this thesis.

Chapter 2 The application of geoarchaeological research principles and multi-disciplinary practice: A southeast Queensland case study (published)

Chapter 3 The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland I (unpublished report)

Chapter 4 The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland II. (unpublished report)

Chapter 5. The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland III (published)

Chapter 6 The environmental management and planning contexts of the geoarchaeological modelling of environmental change in Deception Bay, southeast Queensland IV (published)

Chapter 7 Refining and questioning the palaeogeographic model I (Published poster abstract and presentation)

Chapter 8 Refining and questioning the palaeogeographic model II (published)

Chapter 9 Section I: Research outcomes, wider implications and future directions (unpublished)
Reviews the major outcomes of the geoarchaeological research, considers the incorporation of this research into wider environmental and cultural management processes; and discusses future directions for such research.
SECTION II
Deception, contest and meaning: Explorations of and reflections on the multi-vocality of the Indigenous cultural landscape of Deception Bay southeast Queensland

Introduction:
The introduction to Section II provides a brief summary of each chapter including, where necessary, commentary on the genesis and content of each chapter particularly in the context of the wider development of notions of ‘cognitive ownership’ and analysis of the social construction of heritage value within northern Deception Bay. The introduction concludes with an extended list of all other publications derived from and/or related to the research topic, its methods and/or outcomes to which I have made a contribution. The individual chapters comprising Section II are listed below.

Chapter 10 Contest and landscape I: The objection (unpublished report).

Chapter 11 Contest and landscape II: The court appeal (unpublished report)
Cotter, M.M., 1995. The proposed Beachmere sand extraction site: A report to the Queensland Planning & Environment Court (With regard to archaeological and cultural heritage assessment issues associated with appeal No. 221 of 1995).

Chapter 12 Contest and landscape III: An analysis (published)

Chapter 13 The multi-vocality of landscape I: Otherness and marginalisation. (published)

Chapter 14 The multi-vocality of landscape II: ‘Disagreeable swamp’ or ‘Nourishing terrain? (published)
Chapter 15 The multi-vocality of landscape III: The contested cultural landscape of Deception Bay in wider contexts (published)


Chapter 16 Section II Research outcomes, wider implications and future directions (unpublished)

Reviews the major outcomes of my participant activism and subsequent consideration of the social construction of the Indigenous landscape of northern Deception Bay and discusses future directions of such research.

Chapter 17 Wider Perspectives (unpublished)

Critically examines the outcomes of Sections I and II and briefly evaluates these outcomes in light of current environmental and cultural heritage management trends.

Thesis Epilogue: This little now.

The thesis epilogue provides a brief personal reflection on the effectiveness of this multi-modal study as a negotiation across the culture-nature, science-humanities divide.

References

Although much of what is presented in Section I derives from published works or public domain reports, for the functionality of the thesis all references have been removed from the original texts and collated into a single reference list for Volume 1.

VOLUME II

Introduction

The introduction to Volume II briefly explains the format and content of the appendices, and indicates that each appendix provides published and unpublished material as supporting evidence for the geoarchaeological research presented, especially as described in Section I of Volume 1.

APPENDICES: Geoarchaeological Investigations in Deception Bay Southeast Queensland: The evidence

Appendix A Pollen studies: Principles, methods and summary results.
Appendix B Particle size analysis: Principles, methods and summary results.

Appendix C Particle shape analysis: Principles, methods and summary results.

Appendix D Geochemical and geophysical analyses: Principles, methods and summary results.

References
All the references cited in each Appendix have been removed and collated into a single reference list for Volume II.

ADDITIONAL NOTES

STYLE
This thesis incorporates a number of different forms of published materials. For consistency of style all publications have been given a universal chapter style format. An important element of this format is a ‘frontispiece’ acknowledgement of the nature of the publication in which the work has been presented, and particularly where dual authorship is stated an acknowledgement of my contribution to each component of the work is provided. In some instances where the published material has been a composite work I have, where it made sense to do so, deliberately abridged the work to only include my contribution. These abridgements are acknowledged as footnotes to the text. Also, in this chapter style format original Figures have been renumbered so as to be both sequential within each chapter and throughout the thesis.

In the incorporation of a number of published materials focused on the one research locale, there is inevitably some repetition of information particularly in relation to general descriptions of the study area and its location. To somewhat mediate this repetition and unlike a more conventional thesis, this thesis has been constructed so as to avoid the inclusion of a single chapter focused on detailed description of the biophysical environment of the study area. Nevertheless the general research locale is (a) introduced in the prologue to the thesis, (b) contextualised in relation to the known body of environmental and archeological research conducted within the surrounding region in Chapter 1 and (c) described in its biogeographic context in the first of the published elements of the thesis (Chapter 2) such that there is sufficient detail of the research locale in the text to sustain the focus of the thesis.

DATING TERMINOLOGY
As per convention, unless otherwise indicated in the specific text of publications included in this thesis calibrated radiocarbon dates are referred to in years cal BP (e.g. 2547 cal BP). Specific uncalibrated or conventional radiocarbon ages are presented with their error estimates followed by the descriptor years bp (e.g. 2435 ± 100 yrs bp). Where a precise date is not required a generalised calendrical time scale is
referred to (e.g. about 2500 years ago). More general time intervals are indicated in the form c. 6000 BP (i.e. roughly about 6000 years ago) where no calibration is required or implied.
SECTION I

SCIENCE AND LANDSCAPE IN DECEPTION BAY: TOWARDS A GEOARCHAEOLOGICAL UNDERSTANDING OF THE INDIGENOUS CULTURAL LANDSCAPE OF DECEPTION BAY, SOUTHEAST QUEENSLAND

Plate 4 Sediment sampling in Bayside Drive Lagoon, Beachmere, northern Deception Bay.
SECTION I

SCIENCE AND LANDSCAPE IN DECEPTION BAY: TOWARDS A GEOARCHAEOLOGICAL UNDERSTANDING OF THE INDIGENOUS CULTURAL LANDSCAPE OF DECEPTION BAY, SOUTHEAST QUEENSLAND

INTRODUCTION
An eclectic range of research topics and research locales are currently encompassed under the rubric of a ‘landscape perspective’ within the discipline of archaeology (Ashmore & Knapp, 1999; Fisher & Thurston, 1999). Despite this eclecticism the increasing body of archaeological research grounded in a landscape perspective is unified by its recognition of the dynamic, accretionary, humanly-constructed and maintained nature of landscapes and a concomitant dedication to examining the physical environment - often using a diverse ‘suite of natural science techniques - in order to explicate social scientific research questions. This fundamental tenet of landscape archaeology is further underpinned by an implicit recognition that landscapes are historically contingent entities; and that there exists a recursive link between humans and their landscapes (Feinman, 1999; Fisher & Thurston, 1999).

Section I of this thesis reports the results of a research programme focused upon the application of natural science techniques to explicate the environmental context of the Aboriginal archaeological resources known for Deception Bay, southeast Queensland. The theoretical approach underpinning the research reported is consistent with environmental archaeological / geoarchaeological principles and multi-disciplinary practices (Branch et al., 2005; Brown, 1997; Dincauze, 1987, 2000; Goldberg & Macphail, 2006; Hudak, 1993; Keeley, 1984; Rapp & Hill, 1998; Shackley, 1981); especially those operational within a landscape perspective (e.g.
Section I is comprised of nine chapters. These chapters represent the published and/or publicly presented and critiqued elements of the geoarchaeological research and include examples of the author’s attempts to situate this geoarchaeological information into broader environmental planning and/or cultural heritage management contexts within southeast Queensland. The original form of each of the publications presented is quite varied and includes a refereed paper (e.g. Chapter 2), two reports for local government agencies (Chapters 3 & 4), a poster at a specialist symposium (Chapter 6) one un-refereed paper in a local government and management focused conference volume (Chapter 7) and a refereed chapter within an academic conference proceedings volume (Chapter 8). This highlights the variety of forums within which this geoarchaeological research has proven relevant; and serves also as the record of a research apprenticeship in which the importance of learning to communicate scientific results to varied audiences is practically demonstrated. The chapters are briefly described below.

Chapter 1 is the background document within which the geoarchaeological study of Deception Bay is placed in its local and regional geographical and theoretical contexts. It is particularly focused on the contextualizing (and counterpoising) of this study within the known parameters of the significant body of archaeological research conducted within southeast Queensland since the late 1970s. It is an unpublished manuscript but it has served as the source document for elements of other later chapters presented within this section.

Chapter 2 is a fully refereed paper which represents the first synthesis of the results of the geoarchaeological investigation foreshadowed in Chapter 1. The synthesis incorporates the development of a palaeogeographic model for the Mid-to-Late Holocene evolution of the coastal environment of Deception Bay. In keeping with the multi-disciplinary practice approach of geoarchaeological research the evidence to support this model is derived from geochemical, palynological and specialist dating analyses. By necessity the data obtained through the application of these analyses is reported in this publication in summary only. For the purposes of this thesis this summary is complemented by the technical reports presented in Appendices A and D of Volume II. In combination these technical reports contain the methodological discussions, results and analyses that provide the critical evidentiary support for the palaeogeographic model published in this paper.

Chapters 3, 4 and 5 are all documents that have arisen from opportunities taken to use the information reflected in Chapter 2 to inform environmental and cultural heritage planning specifically within the Caboolture Shire Council Local Government Area - in which Deception
Bay is situated - and more broadly within the catchment area of Moreton Bay, southeast Queensland. Chapter 3 is a report commissioned by the University of Queensland’s Archaeological Services Unit (UQASU). It was prepared as a desktop review of the geomorphic history of northern Deception Bay, and provided commentary on the implications of this geomorphic history for the known and likely Aboriginal archaeological recourses of the Bay. It was requested to support a cultural heritage assessment of the proposed Beachmere (northern Deception Bay) Development Control Plan. Its focus therefore was on the provision of geomorphic data as support for the potential development of a strategic approach to cultural heritage management within Deception Bay. However this commission is also noted as one pragmatic example of how financial support was provided during this research apprenticeship. This is so as the commission by UQASU was remitted by direct payment of all costs associated with my obtainment of two Thermoluminescence dating determinations³ from sand deposits within Deception Bay.

Chapter 4 is a report prepared as one task of a commission awarded to the Centre for Coastal Management at Southern Cross University to investigate historical trends in water quality for the Brisbane River and Moreton Bay Wastewater Management Study. This wider Study, funded under the National Landcare Program, reflected a joint commitment by the six Local Authorities within the Moreton Bay Catchment Area, and the Queensland State Government, to develop ecologically sustainable urban wastewater management strategies for southeast Queensland. The task reported in this chapter was focused on the provision of the baseline evidence for historic change in the sediment facies of the Brisbane River estuary and Moreton Bay with a view to developing an understanding of the natural and anthropogenic effects on water quality within this catchment system. As such this report sits as evidence of the application to environmental planning of the understandings developed through the initiation and conduct of this geoarchaeological research study, particularly with respect to the longer term geomorphic and anthropogenic history of Moreton Bay.

Chapter 5 is a short multi-authored paper included in the proceedings volume of a coastal management conference. Its focus is the relevance of vegetation histories to coastal environmental planning and management. My research into the vegetation history of Ningi Swamp is presented as one of five vegetation history case studies of the ‘coastal wallum’ environment of northern New South Wales and southeastern Queensland. In the context of the thesis it is included as it describes more clearly the palynological results for Ningi Swamp that were used to develop the palaeogeographical model presented in Chapter 2.

³ These determinations were undertaken by David Price at the University of Wollongong.
Chapter 6 is a short paper that was published in a fully refereed and edited volume of papers specifically focused on Moreton Bay. The introduction to the volume starts with the following statement of intent “This volume of work is for the people of the Moreton Bay region, the future of their bay and the health of its catchment” (Tibbets et al., 1998). In his introduction to the geology and geomorphology chapter in which this paper occurs Tibbetts (1998:79) writes “Maria Cotter uses her paper to point out an additional consideration for land use strategies, that of hidden archaeological material and potential loss of such information through various forms of development. She argues for the development of land use planning strategies that incorporate assessments of the value of buried cultural material. Given the rapid growth of Brisbane’s urban satellite areas, both the threat to cultural heritage and need for assessment are very real”

and in so doing acknowledges the contribution of the paper and further expands the ideas within it to make them clearly accessible to the ‘people of Moreton Bay’.

Chapter 7 combines the published abstract and textual content of a poster presented at a Quaternary Dating workshop held by the Australian Institute of Nuclear Science and Engineering (AINSE) at the Australian Nuclear Science and Technology Organisation (ANSTO) facilities at Lucas Heights, Sydney. The poster presents my attempts to understand and resolve dating anomalies encountered during my geoarchaeological investigation of the Quaternary environment of Deception Bay, southeast Queensland. The presentation of this poster in this workshop environment enabled me to discuss my results with leading Australian Quaternary dating specialists, and in this context I received constructive support for my conclusions.

Chapter 8 represents the publication of the results of a detailed sedimentological investigation conceived in order to (a) refine aspects of the palaeogeographic model expounded in Chapter 2, and in particular (b) to enable characterisation of the mechanisms of formation of the many depositional environments noted within Deception Bay. The data used to refine the then current understandings of the environmental history of northern Deception Bay are largely derived from the analysis of the size, distribution and textural qualities of selected sediments variously obtained from the tidal flat, foredune, estuary, lagoon and beach ridge deposits of northern Deception Bay. The data presented in this Chapter is in summary form only and Appendices B and C of Volume II are provided as supplementary technical reports that substantiate the methodology, results and conclusions of the sedimentological studies undertaken as part of this geoarchaeological study.
Chapter 9 is a short unpublished manuscript that provides some critical discussion and reflection on the content and context of the 8 preceding chapters that comprise Section 1. It highlights the major findings of the geoarchaeological study of northern Deception Bay and considers these findings in light of the stated and emergent aims of this research. It provides a glimpse of further directions for such geoarchaeological study and briefly foreshadows Section II.

A list of all publications that are associated with the geoarchaeological study presented in Section I is presented below.

Publications associated with this research topic

Publications


**Reports and manuals**


**Paper and poster presentations**


Plate 6. A local fisherman tries his luck during high tide at Godwin Beach. In this image the flat coastal plain of Deception Bay stretches out from the shallows of Godwin Beach towards Redcliffe Peninsular in the southeast horizon.
CHAPTER 1

GEOARCHAEOLOGICAL RESEARCH AND THE MORETON REGION, SOUTHEAST QUEENSLAND: THEORY AND CONTEXT

Maria Cotter
School of Environmental Science and Management, Southern Cross University, Lismore, NSW.

Unpublished Manuscript

2007 [provided as essential background to the research topic]

Concept and design of research

Concept and project design: Cotter, M.M.

Collection, analysis and interpretation of data

Collection, analysis and interpretation of data: Cotter, M.M.

Writing

Writing, proof reading and edits: Cotter, M.M.

Preparation of tables and graphics: Cotter, M.M.
CHAPTER 1

GEOARCHAEOLOGICAL RESEARCH AND THE MORETON REGION, SOUTHEAST QUEENSLAND: THEORY AND CONTEXT

Archaeological deposits consist of artifacts, ecofacts, and matrix, which are the result of varying degrees of interaction between cultural and noncultural geological and biological systems. A deposit can range from totally anthropogenic sediment to totally natural sediment. One must examine and understand the geomorphological and archaeological contexts before analyzing these data to understand how an archaeological deposit formed (Kolb et al., 1990: 200).

THE BACKGROUND

In 1977 the Moreton Region Archaeological Project (MRAP) was initiated to coordinate archaeological investigations within southeast Queensland (Hall, 1980). The principal objectives of Stage I of the project were to (a) identify the archaeological record, (b) develop a regional archaeological chronology, and (c) identify patterns and questions relevant to the reconstruction of past subsistence - settlement patterns in the region (Hall, 1982a, b). From its inception MRAP was envisaged to be a flexible, long-term, and multistage research programme. It was also determined to comprise three areal components: the subcoastal zone; the coastal zone; and the offshore island zone (Hall & Hiscock, 1988a). In the context of this zonation numerous researchers have detailed archaeological investigations conducted within the coastal zone (e.g. Crooks, 1982; Draper, 1978; Haglund, 1974; Hall et al., 1987; Nolan 1986; Stockton, 1973; Walters, 1986); exclusively within the subcoastal zone (e.g. Bonica, 1992; Hall, 1986; Hall & Hiscock, 1988b; Hall & Lilley, 1987; Hall & Love, 1985; Hall et al., 1988; Hiscock & Hall, 1988a, 1988b; Kearney, 1998; Lilley, 1984; Morwood, 1986, 1987); and on several of the island which comprise the offshore island zone (e.g. Alfredson, 1983, 1984; Bowen, 1989; Durbidge, 1984; Hall, 1980b, 1984; Hall & Bowen, 1989; Hall et al., 1991; Neal & Stock, 1986; Richardson, 1979, 1984; Robins, 1983, 1984a,b; Smith, 1992; 2003; Walters et al., 1987;). Several overviews documenting various stages of the research programme (e.g. Hall, 1980, 1982a; Hall & Hiscock, 1988a; Hall & Robins, 1984), and / or providing a progressive synthesis of research outcomes (e.g. Hall, 1982b, 1987, 1990; Hall & Hiscock, 1988a; Walters, 1986, 1989, 1992a,b) have also been produced.

This research has led to the documentation of more than 1500 archaeological sites within the Moreton Region (Aitken, 1992; Ulm, 2002). In addition, stratigraphic and radiometric evaluation of one of the 62 sites so far examined in detail (Ulm, 2002; Ulm & Reid, 2000, 2004;) has indicated continuous human occupation in the region for the past 20,000 years (Hall & Hiscock, 1988a; Neal & Stock, 1986). However variations in both the spatial and temporal components of the regional archaeological record have been demonstrated. For example, Wallen Wallen Creek, the only Pleistocene coastal site
in southeast Queensland (dated to c. 20,560 ± 250 years bp; Neal & Stock, 1986), is situated on North Stradbroke Island, an offshore island. All other offshore island sites, with the exceptions of Hope Island (i.e. 4350 ± 220 years bp; Walters et al., 1987) and Bribie Island (i.e. 3300 ± 80 years bp; Smith, 1992) have radiocarbon age determinations of less than 2500 years BP. Similarly within the coastal zone although sites such as the New Brisbane Airport site (i.e. 3910 ± 80 years bp; Hall & Lilley, 1987) reflect a Mid Holocene occupation, most sites are first occupied only within the Late Holocene, typically within the last 1500 years (Ulm et al., 1995) (Figure 1.1). In contrast to this, stratigraphic and radiocarbon evidence from subcoastal sites such as Bushrangers Cave (10,196 cal BP; Kearney, 1998), Platypus Rockshelter (5305 years cal BP; Hall et al., 1988), Gatton Rockshelter (c. 3030 ± 90 years bp; Morwood 1986) and Maidenwell Rockshelter (c. 4300 ± 70 years bp; Morwood, 1986) reflect a continuous occupation of the subcoastal zone throughout the Holocene and especially from the Mid Holocene (Figure 1.2).

The above noted spatial and temporal variations in the Moreton Region archaeological record are superimposed over a generally recognised trend towards a Late Holocene increase in site number and / or site use both within the coastal subregion (Bowen, 1989; Hall, 1984; Hall & Robins, 1984; Nolan, 1986; Walters, 1986, 1989, 1992a,b) and the subcoastal zone (Hall & Hiscock, 1988a, 1988b; Hall et al., 1988; Hiscock & Hall, 1988a,b; Morwood, 1986, 1987). This regional trend towards increasing numbers of archaeological places and increasing utilisation of such places within the Moreton Region during the Late Holocene parallels spatio-temporal patterns widely reported elsewhere within Australia for this time period (e.g. Attenbrow, 1982, 2004; Barker, 1991, 1996, 2004; Beaton 1985; David, 1991; Lourandos, 1980, 1983; McNiven, 1991, 1992; Morwood & Hobbs, 1995; Ross, 1981, 1985; Rowland, 1983, 1989; Smith, 1988, 1996; Veth, 1989, 1995; Williams, 1987). Indeed within Australian prehistory this trend became the focus of an intellectual debate prominent within the literature throughout the 1980’s and early 1990’s (e.g. Beaton, 1983, 1985 cf Lourandos, 1983, 1984, 1985a,b & also Rowland 1983, 1989). This debate was referred to as the “Intensification Debate”, largely because the widely observed spatio-temporal patterns, although variously manifest in the archaeological record, were considered to reflect an intensification in prehistoric site occupation and regional resource use (typically associated with the exploitation of new environments and resources and the development of new technologies) during the Mid-to-Late Holocene (Lourandos, 1983, 1984, 1985a,b, 1993, 1996, 1997; Lourandos & Ross, 1994). Within the literature considerable emphasis has been placed on the iteration of explanations for these perceived Mid-to-Late Holocene changes in the Australian archaeological record (Lourandos & Ross, 1994). Throughout the broad range of explanations offered for this series of ‘parallel, pene-contemporaneous changes’ (Frankel, 1995) in the prehistoric record of Australia one or other of the following four contrasting agencies of change have been featured:
Wallen Wallen Creek on North Stradbroke Island provides earliest evidence for human occupation of Southeast Qld.

- Archaeological deposits dated to 21,800+/−400 bp (charcoal).
- Human occupation spans Pleistocene/Holocene boundary with youngest deposits dated to 1000 years BP.

All other offshore island sites, with the exceptions of:

- Bribie Island (i.e. 3300 ± 80 years bp);
- Hope Island (i.e. 4350 ± 220 years bp)

Have radiocarbon age determinations of less than 2500 years BP.

Within the coastal zone:

- Mid-Holocene Sites such as the New Brisbane Airport site (i.e. dated to 3910 ± 80 years bp) do occur.

But

- The majority of sites occur only within the Late Holocene, typically after 2,500 years BP and especially after 1500 years BP.
Elements of each of these four contrasting catalysts of change have been variously used to specifically explain the patterning of the Late Holocene archaeological record of Australian coastal environments. For example, Barker (1996, 2004) in emphasising the catalytic role of social processes in the development of the regional archaeological record of the Whitsunday Islands, indicates that throughout Australia Late Holocene changes in the archaeological signature of coastal environments have variously been interpreted as being related to such factors as: sea level change and its effects on coastal resources and coastal populations; the lack of a suitable technology to exploit maritime resources; population increase forcing the use of hitherto marginal environments; and preservation factors affecting survival of earlier sites. Nevertheless, it should be noted that recent considerations of the evidentiary base for this Mid-to-Late Holocene intensification have reflected upon the importance of scales of analysis (Frankel, 1995; O’Connell & Allen, 1995; Ulm, 2004), biases in the perception and interpretation of data (Bird & Frankel, 1991; Edwards & O’Connell, 1995; Rowland, 1989;) and the need to recognise the dynamism and fluidity of past human-environment interactions (Lourandos, 1996, 1997). In this regard, Ulm (2004) for example has shown that for the Curtis Coast region of southeast Queensland the trajectory of late Holocene change in the archaeological record is not one of undifferentiated cumulative increase in occupation. Ulm (2004) identifies periods of reduced occupation and/or abandonment within the Southern Curtis Coast during the Mid-to-Late Holocene.

post depositional effects on the preservation and visibility of earlier sites (e.g. Head, 1986; Rowland, 1989);

the influence of technological change on stone artefact discard rates (e.g. Hiscock, 1986);

climactic amelioration and/or sea-level fluctuations (e.g. Beaton, 1985; Smith, 1988, 1996; Veth, 1989, 1995) and;

socio-demographic factors such as increased social complexity (e.g. Barker, 1991, 1996, 2004; Lourandos, 1983, 1984, 1985a,b; Ross, 1981, 1985; Williams, 1987).
This data reflects a trajectory for change that is counter to the above noted pene-contemporaneous ‘continental narrative’ of ‘intensification’ and hence suggests that refinement of our understanding of the Australian Aboriginal archaeological record is required at local and regional scales of analysis.

The Moreton Region Archaeological Project was neither immune to, nor ignorant of, the theoretical underpinnings of the ‘Intensification Debate’. In fact the initial aims of the Project to reconstruct cultural patterns and to integrate these results into current problems within the broader Australian prehistory, although formulated prior to the explicit expression of the debate within the literature (*i.e.* c. 1983), were well placed to both inform and to be informed by the debate. The commencement in 1988 of MRAP Stage II, a research programme oriented towards the delineation and explanation of perceived changes in the known archaeological record of the Moreton region (Hall & Hiscock, 1988a), reflects the Australian wide focus on developing explanations for change in the archaeological record initiated by the intensification debate (Lourandos & Ross, 1994). As a corollary to this, one outcome of the MRAP-based research has been the proliferation of subsistence - settlement models to explain attributes of the regional prehistory, in particular the widely observed increase in exploitation of the coastal zone during the past 2000 years (Hall, 1982b; 1987; Hall & Bowen, 1989; Hall & Hiscock, 1988a; Hall & Robins, 1984; Morwood, 1986, 1987; Smith, 1992; Walters, 1989, 1992a,b). A common element in all of the explanatory models devised is the critical importance of the interaction between past human groups and the coastal resource zone of southeast Queensland. Ulm and Hall (1996) have succinctly stated this commonality in the following terms:

> Interpretations of regional cultural change in southeast Queensland have essentially polarised around two views: one emphasising that coastal landscapes and resources have only recently emerged as a focus of settlement and the other holding that people were always on the coast (Ulm & Hall, 1996: 46).

The protagonists in this polarised debate are Walters (1986, 1989, 1992a,b) with Morwood (1986, 1987) who have both argued —although with varying emphasis—that the coastal landscape of Moreton Bay has only developed as an exploitable resource zone in the Late Holocene; and Hall (1982, 1987, 1990, 1999 and also Hall & Bowen, 1989; Hall & Hiscock, 1988a, Hall & Lilley, 1987; Hall & Robins, 1984) who posits that a human presence was maintained within the coastal zone throughout the Holocene, albeit in sparse numbers until after the Mid Holocene Marine Transgression and subsequent stabilisation of the coastal estuarine zone. The fundamentals of each explanatory model are detailed below.

**WALTERS’ MODEL - INCREASED EXPLOITATION OF A MARGINAL MARINE ENVIRONMENT**

Based on apparent evidence for the increased discard of fish remains in Late Holocene (post 2000 BP) coastal deposits within Moreton Bay- [and note critiques of this assessment by Ulm, 1995; 2002] - Walters (1986, 1989, 1992a,b) has developed an explanatory model for the regional archaeological record that emphasises a Late Holocene intensification in social complexity. In essence this model
maintains that the adoption of specialised marine fishing required the reordering of resource exploitation systems from mobile hunting and gathering to more marine resource focused sedentism that further facilitated population growth. This model was sustained by a ‘time-lag’ hypothesis in which the marine and estuarine environment of Moreton Bay was considered to have remained a marginal resource zone for up to 4000 yrs post the Mid Holocene Marine Transgression, hence the late Holocene (post 2000 BP) florescence of coastal sites (cf Beaton, 1985; and note discussion of Hall’s model below). Furthermore, Walters (1989) maintained that the reduction in the marginality of the coastal zone was the result of a chain of anthropogenic influenced events in the catchments of the rivers that debouch into Moreton Bay. Aboriginal firing of the coastal hinterland was posited to increase erosion and lead to increased stream sediment loads and hence the greater transport of such sediments to the coast. Deposited in the western sector of Moreton Bay these muds and muddy sands formed the substrate of a resource rich littoral zone that encouraged the growth of sea grass beds and significantly enhanced fish stocks. The argument in support of human agency as a driver for Mid-to-Late Holocene environmental change within Moreton Bay as suggested by Walters (1989) corresponds with the prior argument of Hughes & Sullivan (1981), more recently supported by Kohen (1996), that Aboriginal burning practices promoted soil erosion, concomitant increases in stream sediment loads; and increased siltation of rivers and coastal embayments throughout eastern Australia. Neil (1998) provides a useful critique of this argument in which he maintains that anthropogenic burning is likely to have increased catchment sediment yields by no more than [and probably much less than] 10% during the late Holocene, and although a crude estimate it is more probable that natural ecological factors were the most likely drivers for change in the sedimentary regime of the Moreton Bay catchment at this time.

**Morwood’s Model - Increasing Social and Demographic Complexity in a Resource Rich Environment**

In contrast to Walters’s view of Moreton Bay as a marginal environment Morwood (1986, 1987) proposed a model for the prehistory of southeast Queensland in which he maintained that ethnographic evidence for high populations within the region was consistent with a resource rich environment. Moreover he considered that because of seasonal and geographical differences in resource availability, particularly a coastal glut in sea mullet during winter and an inland glut in bunya nuts during summer, this environment had promoted demographic flexibility amongst prehistoric inhabitants (Morwood, 1987). Furthermore the exploitation of these seasonally intermittent resources, by high populations of hunter gatherers, was considered to require regional networks of alliances and economic reciprocity such that this social complexity effectively enhanced the carry capacity of the resource base.

Significantly Morwood (1987:343) stressed that "*Important components of the necessary resource framework were post-Pleistocene developments, resulting from the formation of Moreton Bay*". He posited a bi-modal model of resource exploitation and availability which was broadly aligned to the
Mid-Holocene marine transgression. In this model prior to c. 6000 BP southeast Queensland was envisaged to have had a low population density of which small mobile groups sparsely occupied 'optimal' resource zones. It was further envisaged that due to fluctuating sea-levels during this period the productivity of the littoral environment was minimised and hence there was little exploitation of the coastal zone.

Subsequent to c. 6000 BP, Morwood supposed that the formation of the present Moreton Bay, coupled with a long period of relative sea level stability, promoted the development of a highly productive littoral resource zone which provided scope for an accelerated (logarithmic) increase in population density, especially after c. 4000 BP. Although initially triggered by an expanded resource base Morwood considered that this population increase was later enhanced by the development of social and demographic mechanisms (e.g. alliance networks, & ceremonial gatherings) which increased the effective carrying capacity of this abundant, though seasonal, resource region. This model of increasing social complexity through time has been critiqued most especially by Hall & Hiscock (1988a). These authors challenged the model for social complexity on the basis that there was insufficient data to support a hypothesis for dramatic increases in the number of sites and/or in the intensity of their occupation/use after 4500BP. Likewise there was too little data relating to symbolic practices within the region to make generalisations about the nature and/or timing of changes in social organisation within the Moreton Region during the late Holocene.

**HALL’S MODEL - GRADUAL HUMAN ADAPTATION TO CHANGE**

In 1984 Hall (with Robins) provided one of the first models which attempted to explain the perceived changes in the archaeological record of the Moreton Region (Hall & Robins, 1984). The central theme of this model was gradual human adaptation to change especially in response to variation in sea levels. For example observed Late Holocene increases in site use and site numbers on Moreton Island (Robins, 1984) were linked to (a) an initial abandonment of the island, due to restrictions in the resource base as a consequence of landward inundations during the Mid Holocene marine transgression and to (b) a subsequent reoccupation of the island as the progradation of tidal flats and the siltation of estuaries along the foreshores promoted the development of a rich, and increasingly exploitable littoral zone (Hall & Robins, 1984). Sea-level fluctuations were thus considered to be the major impediment to the continuous occupation of Moreton Island throughout the Mid-to-Late Holocene. Likewise the late onset of a rich littoral resource zone was the preferred explanation for the increase in site utilisation and site number observed for Moreton Island, particularly within the last 1000 years. Significantly Hall & Robins (1984) considered their scenario to be a working model for Moreton region prehistory, providing a parsimonious explanation of the known archaeological record but requiring further adjustment when and if new archaeological data became available. The model found immediate support in the coastal occupation ‘time-lag’ hypothesis developed by Beaton (1985) to explain the lack of archaeological sites older than c. 4700 years BP at Princess Charlotte Bay, North Queensland. In this hypothesis coastal occupation was considered to have lagged behind sea-level
stabilisation, subsequent to the Mid Holocene marine transgression, by up to 2000 years. In essence, development of a coastal economy was considered to have required the environmental stasis that came about only after the ecological adjustments of post-transgressive times (Beaton, 1985). In the Moreton region the ‘time-lag’ hypothesis was however soon to be challenged by the evidence for continuous occupation of North Stradbroke Island throughout the Late Pleistocene and early Holocene (Neal & Stock, 1986).

Hall (1987, 1990; 1999 and see Hall & Hiscock, 1988a) has continued to refine aspects of this model for gradual human adaptation to environmental change during the Mid-to-Late Holocene. In these refinements evidence for the Mid Holocene occupation of subcoastal zone sites such as Platypus Rockshelter (Hall, 1986) has been used to support the notion that a gradual westward movement of peoples away from the offshore islands occurred within the Moreton Region, sometime prior to the culmination of the Mid Holocene marine transgression c. 6000 years BP. In this scenario the continuous occupation of North Stradbroke Island throughout this period is explained in terms of this offshore Islands proximity, and hence accessibility, to the mainland. An important additional feature of this revised model is the link made between gradual adaptation to change (Hall & Robins, 1984) and systemic population increase (Hall, 1990; Hall & Hiscock, 1988a cf. Beaton, 1983, 1985). This link is forged so that resource pressure, in an increasingly bountiful coastal zone, can be proposed as a trigger for an observed differentiation in resource exploitation strategies at about 2000 years ago. In essence the refined model maintains that at this time, and particularly within the last 1000 years, resource pressure triggered social adjustment whereby a coastal lifeway with a littoral/marine resource based economy became distinct from a more terrestrial/riverine based prehistoric lifeway (Hall, 1987).

A significant feature of the revised model for gradual adaptation to environmental change is the increased emphasis placed on human modification of the landscape. Hall (1990), adopting ideas expressed by Walters (1989), outlined environmental and archaeological evidence in support of an hypothesis that humans modified the southeast Queensland landscape during prehistoric times, particularly through the use of fire [and note again the above mentioned critique of this notion by Neil (1998)]. Based on (a) the evidence of a palynological study of a single sediment facies from the Maroochy River (i.e. Bell, 1979); and (b) inferred vegetation patterns derived from palynological investigations conducted within southern and temperate Australia, Hall maintained that: within subcoastal southeast Queensland vine forests retreated and gave way to eucalypt forest and grasslands between 5000 and 3000 years ago (Hall, 1990; Walters, 1989). This purported vegetation change is consistent with the expectation that prehistoric Aboriginal burning practices promoted fire resistant plant species (e.g. Eucalypts) at the expense of non-fire resistant species such as vine forests (Carr & Carr, 1981; Kershaw, 1975, 1986, 1994; Kershaw et al., 1993; Kohen, 1996; Singh et al., 1981; Singh & Geissler, 1985). Hall (1990) points out that within southeast Queensland this vegetation change
corresponds with the commencement of the prehistoric occupation of subcoastal zone sites such as Platypus Rockshelter.

Aboriginal burning practices throughout Australia, in addition to inducing vegetation changes are also considered to have promoted certain animal habitats at the expense of others (Nicholson, 1981; Kohen, 1996). It is therefore considered significant by Hall (1990) that during the proposed period of vine-forest decline within southeast Queensland (i.e. 5000 - 3000 years BP) archaeological deposits in the subcoastal zone document a change whereby faunal species associated with rainforest habitats decline and give way to more open forest species like the Agile Wallaby *Macropus agilis*. Interestingly the occurrence of this wallaby in these archaeological deposits ceases between c. 2000 years BP and c. 600 years BP due to a probable local extinction (Morwood, 1986; Hall, 1990). For Hall this is particularly noteworthy given the fact that this species is presently restricted to northern Australia where it favours areas regenerated after fire. He considers this evidence and suggests that:

> It is quite possible that Aboriginal firing in this region promoted their abundance on the one hand but that on the other hand Aboriginal hunting techniques...provided a force to 'push' them over the threshold to local extinction (Hall, 1990:179).

Finally, in this most recent revision of the gradual human adaptation to change model evidence obtained from two studies of the Quaternary geology of Moreton Bay (i.e. Hekel *et al*., 1979; Jones & Stephens, 1981) is used to support Walters’ (1989) argument that human-induced increases in erosion occurred within southeast Queensland during the Holocene. Hall (1990) maintains that evidence for increased Holocene siltation within Moreton Bay comes from a reported Late Holocene shift in coral genera from *Acropora*, which favours clear waters, to *Favia* which is more mud tolerant (Hekel *et al*., 1979). He also maintains that evidence for deep Holocene muds and sands within submarine Moreton Bay attests to the transport and deposition of eroded subcoastal sediments by the rivers which flow into the bay and, as already noted, speculates that this erosion was caused by Aboriginal firing of the subcoastal zone. He further suggests that the change to a muddy substrate within Moreton Bay as affected by Aboriginal burning of the subcoastal zone provided the necessary platform for the Late Holocene development of a rich and exploitable littoral zone.

**CONSIDERING THE MODELS**

What is resolved from this brief examination of these competing explanatory models is that studies of the coastal evolution of the region as derived from sedimentological and geomorphological investigation (e.g. Flood 1979, 1980, 1981, 1983; Hekel *et al*., 1979; Jones & Stephens, 1981; Stephens, 1986) have been routinely adopted as a framework for explicating the archaeological record of Moreton Bay (e.g. Hall, 1987, 1990, 1999; Hall & Robins, 1984; Walters, 1986, 1989). This is perhaps not surprising, since as Scarre has claimed:
No prehistorian concerned with the archaeology of a coastal region can possibly afford to ignore the important and sometimes spectacular transformations which the coastline and the character of the littoral zone have undergone as a result of changes in sea-level (Scarre, 1984:98)

However, except in the fortuitous case of the New Brisbane Airport site (Hall et al., 1987) where Aboriginal artefacts were discovered in an excavation pit by a trained geomorphologist; few of the geomorphological studies conducted in the Moreton Region, to date, have been specifically designed to consider the regional archaeological record or particular sites. Similarly Platypus rockshelter (Hall & Hiscock, 1998b) and Bushrangers Cave (Kearney, 1998) appear to be the only sites within southeast Queensland where archaeological researchers have purposefully employed direct enquiry of the palaeoenvironmental record as a research aid. From an archaeological perspective this is regrettable since it has been demonstrated that topographical features (e.g. proximity to water, height above sea level, dune height and vegetation type) are both (a) consistently associated with extant middens and (b) are probable key determinants of archaeological site location within the Moreton Region (Hall, 1996; Richardson, 1984; Robins, 1984a).

More importantly, geomorphological, sedimentological and palaeobiological data obtained from Moreton Bay is equivocal, especially with respect to the nature and timing of sea-level fluctuations, particularly at the sub-regional level, and during the Mid to Late Holocene (Table 2.1). Likewise there is at present insufficient palaeoecological data to: (a) firmly establish the effects of these sea-level fluctuations on vegetation communities and littoral resource zones or to; (b) firmly establish past local and regional climatic trends. Several pre-Quaternary palynological investigations have been conducted within southeast Queensland, and a comprehensive regional Mesozoic biostratigraphy has been established (De Jersey, 1971, 1976; De Jersey & Paten, 1963; McKellar, 1978, 1981a,b, 1982).

Table 1.1. Dated evidence for Mid Holocene sea level, Moreton Bay southeast Queensland

<table>
<thead>
<tr>
<th>Location</th>
<th>Sediment Facies</th>
<th>Age Determination (Years B.P.)</th>
<th>Inferred sea level height (relative to present levels)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bribie Island</td>
<td>Fossil coral in sandrock just below MLW northern tip of island</td>
<td>6300 ± 500 yearsa</td>
<td>c. ± 0 m</td>
<td>Ward, et al. 1977</td>
</tr>
<tr>
<td>Bribie Island</td>
<td>Fossil molluscs in sandrock just below MLW northern tip of island</td>
<td>3890 ± 140 yearsb</td>
<td>c. ± 0 m</td>
<td>Ward, et al. 1977</td>
</tr>
<tr>
<td>Mud Island</td>
<td>An Acropora coral colony located at northeastern end of the island</td>
<td>4,600 ± 200 yearsa</td>
<td>c.+1m  (above present reef growth)</td>
<td>Jones, et al. 1978, Flood, 1983</td>
</tr>
<tr>
<td>Peel Island</td>
<td>In situ Favia coral colony located in open water on eastern side of island</td>
<td>6,700±170 yearsa</td>
<td>c.+1m (above living microatoll)</td>
<td>Hekel, et al. 1979,</td>
</tr>
<tr>
<td>Pine River</td>
<td>Timber fragment of Eucalyptus propinquia in estuarine muds and silts 7.5km above present river mouth</td>
<td>6390 yearsa</td>
<td>c.+1.5m</td>
<td>Hoffman, 1980</td>
</tr>
<tr>
<td>Nudgee</td>
<td>Shell collected from stranded beach deposit</td>
<td>4850±105 yearsa</td>
<td>c.+1m</td>
<td>Hekel, et al. 1979; Ward &amp; Hacker, 1982; Flood, 1983, 1984</td>
</tr>
<tr>
<td>Deception Bay</td>
<td>Anadara trapezia shell collected from beachridge</td>
<td>5790 ±190 yearsa</td>
<td>c. ±0m</td>
<td>Flood, 1981</td>
</tr>
<tr>
<td>Deception Bay</td>
<td>Anadara trapezia shell abandoned intertidal flat</td>
<td>4685±145 yearsa</td>
<td>c.+0.7m</td>
<td>Flood, 1981</td>
</tr>
<tr>
<td>Deception Bay</td>
<td>Anadara trapezia shell, abandoned tidal flat</td>
<td>3300±100 yearsa</td>
<td>c.+0.4m</td>
<td>Flood, 1981</td>
</tr>
</tbody>
</table>

a= Reported age determination for sample material subjected to conventional radiocarbon dating techniques.
b= Reported age determination for sample material subjected to Uranium disequilibrium series dating techniques.
MLW= Mean Low Water

4 The Pleistocene archaeological site of Wallen Wallen Creek is a noted exception where geomorphological and preliminary palynological investigations were part of the research undertaken at this site (Dudgeon, 1987; Neal 1987; Neal & Stock; 1986).
However few Quaternary palynological studies have been conducted within southeast Queensland (Butler, 1994; Longmore, 1997; Peters, 1990) and prior to this research only four studies have been reported from Moreton Bay (Bell, 1979; Boyd, 1993; Dudgeon, 1987; Pickett et al., 1984)\(^5\). Bell (1979) reported on a study of an isolated peat deposit collected from near Myora Reef which was 14C dated to >37,000 years BP while Pickett et al. (1984) provide details of a pollen assemblage obtained from a peat deposit buried beneath a high dune near Amity, North Stradbroke Island which was associated with fossil corals dated by uranium series to c. 105,000 years BP. Both these Pleistocene peat deposits suggest that there has been little change in the vegetation communities of Moreton Bay for the past 100,000 years. However the scale of analysis is problematic with both deposits occurring in an isolated rather than a stratigraphic context and hence neither can be considered to provide sensitive temporal data on climatic or vegetation fluctuations within the region. In addition Bell (1979) reported on the pollen spectra derived from a single mud sample collected from – 4 m below present marine low water datum near the Maroochy River that was dated to c. 7500 years BP. This sample yielded vine thicket taxa, and has been readily incorporated into the archaeological literature as demonstrating the subcoastal catchment vegetation of the Moreton region prior to human induced firing of the landscape (Walters, 1989; Hall, 1990). However as this data is derived from a single sample (and a count of 700 pollen grains in total), the archaeological inferences made are not sustainable. This is especially so when with respect to the vegetation communities across the total sub-coastal zone, the riparian zone from which the sample is derived is likely to be atypical. Moreover, the longevity of the archaeological record now presented for Bushrangers cave (i.e. c. 10,000 BP) challenges interpretations of the nature, timing and influence of any Aboriginal burning of the landscape in southeast Queensland.

In some contrast to these single sample studies Dudgeon (1987) reports a preliminary palynological investigation of the Wallen Wallen Creek archaeological site in which 5 samples taken from 15 cm sections of soil column from depths between 30 and 200 cm were analysed. This study identified approximately 15 pollen and spore types; concluded that it was likely that a swamp had been active adjacent to the Wallen Wallen Creek site for at least the last 13, 560 years, and suggested that there had been little change in the vegetation patterns about this swamp for this period. However, the pollen yield from these samples was low with only the top sample yielding more than 115 pollen grains. Thus inherent inaccuracies in the data are likely particularly in two of the samples where less than 100 pollen grains were identified. In addition the pollen identifications reported appear broad and speculative with descriptions such as:

*Myrtaceae is by far the dominant element indicating either a Eucalypt or Melaleuca (or both) dominated vegetation. The pollen are probably Melaleuca suggesting a swampy environment*\(^5\).

\(^5\) Further preliminary palynological data have recently been reported for perched swamps on North Stradbroke Island (Moss, P. pers. comm. 2006).
Boyd (1993), also working on North Stradbroke Island has detailed a c. 2,000 year palynological record obtained from a sediment core taken from Eighteen Mile Swamp. This pollen sequence indicates that in this area Holocene vegetation patterns fluctuated in response to changing hydrological regimes under the influence of eustatic changes. The swamp had in fact, likely only existed for the last 600 years prior to which the area had been a low energy elongate tidal embayment. These data are not of sufficient antiquity to explore vegetation trends throughout the known Pleistocene occupation of Stradbroke Island. Likewise the palynological sequence analysed by Boyd (1993) is relatively site specific (and locally geographically isolated) and hence provides data that is insufficient to finely resolve broader historical changes in the vegetation pattern of the region.

Though briefly outlined, the above noted ambiguities and insufficiencies of environmental data call into question current models devised to explain the Moreton region archaeological record. The models are compromised by a critical dependence on palaeoenvironmental data which remains equivocal with respect to environmental phenomena and which has generally been obtained in a context not designed to complement or answer archaeological research questions. As Dodson et al. (1993) have explained there is an essential dichotomy between archaeological research and palaeoenvironmental research which limits the effective integration of archaeological and palaeoenvironmental data. This dichotomy is principally reflected in the viewpoint that archaeological research pertains to the study of human systems whilst palaeoenvironmental research is seen to equate with the study of natural systems (Macinnes & Wickham-Jones, 1992). However, the links between physical environments and cultural phenomena are complex and changing, and it is the “web of interactions” (Butzer, 1982), rather than mutual exclusivity that is the fundamental dynamic of human ecosystems (Butzer, 1982; Dodson et al., 1993; Groenman-van Waateringe, 1988; Warner, 1996). Therefore, for a more robust modelling of past cultural systems, it is apparent that the recovery and exposition of relevant palaeoenvironmental data needs to occur from within the archaeological research paradigm.

Environmental or (geo) archaeology—in the sense proposed by Butzer (1982)—offers a contextual approach from within the discipline of archaeology through which to pursue the effective integration of palaeoenvironmental and archaeological data in analyses of past cultural systems. This is so because the primary goal of environmental archaeology is to:

\[define \textit{the characteristics and processes of the biophysical environment that provide a matrix for and interact with socioeconomic systems}... \] (Butzer, 1982:6).

This is of course providing that both the scales of analysis and the research questions posed are applicable to the particular human - environmental relationships under investigation (Dincauze, 1987, 2000; Goldberg & Macphail, 2006). Furthermore, as Dincauze (1987) has argued, within the field of environmental archaeology a distinction must be made between studying the ecology of archaeological sites and studying the ecology of the human occupants of a site. This is because site ecology (\textit{i.e.} the
effort to understand the depositional and transformational processes that have formed a site) is conceptually, although not necessarily operationally, distinct from describing past environments in order to assess their effects upon human lives and cultures.

**THE RESEARCH**

In Dincauuze’s (1987) terms, Section I of this thesis is concerned with the “ecology of archaeological sites” rather than human-environment interactions *per se*. It documents a palaeogeographic research programme initiated, within the framework of the Moreton Region Archaeological Project, to reconstruct elements of the past environment of northern Deception Bay, southeast Queensland (Plate 1; Figure 1.3). The research programme outlined has been preceded by considerable archaeological investigation of Deception Bay and the adjacent areas of Pumicestone Passage and Bribie Island (e.g. Crooks, 1982; Draper, 1978; Haglund, 1974; Hall, 1982a; Hall *et al*., 1987; Hall *et al*., 1991; Nolan, 1986; Smith, 1992 [and 2003]; Stockton, 1973), and as a consequence, this study has not been designed to incorporate a further comprehensive archaeological survey of the area. The study is designed to ascertain the environmental conditions that prevailed during the formation and subsequent preservation of the currently known and researched archaeological record. Central to the approach adopted is the acquisition and analysis of environmental data from landscape elements associated with known archaeological features of Deception Bay and wholly derived from within the landscape familiar to the Ningi Ningi clan noted to inhabit the area during the ethnographic present (Eipper, 1841; Nique & Hartenstein, 1841; Steele, 1970, 1984).

![Figure 1.3 Location map of the study area, northern Deception Bay southeast Queensland (prepared by Greg Luker, GIS Laboratory Manager, Southern Cross University).](image)
The theoretical approach underpinning the research programme is consistent with environmental archaeological / geoarchaeological principles and multi-disciplinary practice (Shackley, 1981; Keeley, 1984; Dincauze, 1987, 2000; Hudak, 1993; Brown, 1997; Rapp & Hill, 1998; Branch et al., 2005; Goldberg & Macphail, 2006); especially those operational within a landscape perspective (e.g. Butzer, 1982; Boyd, 1990; Rossignol, 1992; Ashmore & Knapp, 1999; Feinman, 1999; Fisher & Thurston, 1999). In particular this study adopts principles and practices common to the disciplines of ethnography, historiography, geomorphology, sedimentology, geochemistry, palynology and palaeobotany in an attempt to develop a model for coastal landscape evolution within northern Deception Bay, and where practicable, to relate this model to aspects of the known archaeological record of the area. By adopting such a landscape approach it is expected that for Deception Bay the potentially synergistic relationships within and between the coastal environmental system, its landscape physiography and the spatial and temporal aspects of past human – environment interactions will be explored and revealed (Rossignol, 1992). The following chapters represent the publications that derive directly from the data obtained in this geoarchaeological research programme and/or the author’s attempts to situate the geoarchaeological information derived into broader contexts of environmental and cultural heritage management within the Moreton Region.
CHAPTER 2

THE APPLICATION OF GEOARCHAEOLOGICAL RESEARCH PRINCIPLES AND MULTI-DISCIPLINARY PRACTICE: A SOUTHEAST QUEENSLAND CASE STUDY

HOLOCENE ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND: A PALAEOGEOGRAPHICAL CONTRIBUTION TO MRAP STAGE II.

Maria Cotter
School of Resource Science and Management, Southern Cross University, Lismore NSW 2480, Australia.

Published paper

Concept and design of research
Concept and Project Design: Cotter, M.M.

Collection, analysis and interpretation of data
Collection, analysis and interpretation of data: Cotter, M.M.

Writing
Writing: Cotter, M.M.

Proof reading and edits: Cotter, M.M.

Preparation of Tables and Graphics: Cotter, M.M.
CHAPTER 2
THE APPLICATION OF GEOARCHAEOLOGICAL RESEARCH PRINCIPLES AND MULTI-DISCIPLINARY PRACTICE: A SOUTH EAST QUEENSLAND CASE STUDY

HOLOCENE ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND: A PALAEOGEOGRAPHICAL CONTRIBUTION TO MRAP STAGE II.

ABSTRACT
Stage II of the Moreton Region Archaeological Project (MRAP) is oriented towards the delineation and explanation of perceived changes in the archaeological record (as identified in MRAP Stage I), particularly as a tool for reconstructing past subsistence-settlement patterns in the region (Hall & Hiscock, 1988). Within the framework of MRAP Stage II, palaeobotanical and geomorphic evidence of mid-to-late Holocene coastal evolution is described for Deception Bay. Radiocarbon and thermoluminescence age determinations of several sediment facies within the bay provide a chronometric framework for this coastal evolution, a framework directly comparable to the archaeological record. Coastal progradation, wind-blown sand transport, and the intermittent formation of tidal lagoons adjacent to the shoreline are features of the geomorphic history of the bay. This geomorphic history provides some explanation of both the spatial and temporal patterns observed in the archaeological record. Discussion is accordingly directed towards an assessment of the likely impact of this coastal evolution on the formation, preservation and present visibility of the archaeological record of Deception Bay. It is pertinent to note that this paper is derived from research in progress towards a Master of Applied Science degree at Southern Cross University. In this context the interpretative model presented is considered to be well supported by the available evidence, although a detailed documentation and discussion of this research (Cotter, in prep) will further clarify and refine aspects of this model.

INTRODUCTION
In 1977 the Moreton Region Archaeological Project (MRAP) was initiated primarily to coordinate archaeological investigations conducted within southeast Queensland (Hall, 1980). Its objectives were notably to (a) identify the archaeological record, (b) develop a regional chronology and (c) identify patterns and questions relevant to the reconstruction of past subsistence-settlement patterns in the region (Hall, 1980, 1982a). By 1988, with the documentation of more than 1000 sites and the excavation and detailed examination of more than 40 sites, these objectives had been achieved (Hall & Hiscock, 1988). Thus MRAP Stage II, a research programme oriented towards the delineation and explanation of perceived changes in the known archaeological record was commenced (Hall & Hiscock, 1988). Operating within the framework of MRAP Stage II, this paper presents summary details of a palaeobotanical and geomorphological research project focused on the reconstruction of the past environment of northern Deception Bay, southeast
Queensland. Supplemented by radiometric and thermoluminescence age determinations, a mid-to-late Holocene coastal evolution model is described for Deception Bay. The likely impact of this evolution on the formation and preservation of the regional archaeological record is discussed.

DECEPTION BAY: THE ENVIRONMENTAL AND ARCHAEOLOGICAL CONTEXT

Within southeast Queensland, Deception Bay forms the most northern mainland coastal element of the larger, more widely known, Moreton Bay (Figure 2.1). It is a tidal embayment, protected to the east from high energy, oceanic wave action by three barrier islands, namely Bribie Island, North Stradbroke Island and Moreton Island. In the absence of strong tidal currents, prevailing southeasterly and southwesterly winds produce the wave climate of Deception Bay, and promote a northerly current to flow along the shoreline (Patterson & Witt, 1992; Stephens, 1992). The shoreline is dominated by a relatively flat coastal plain comprised of estuarine mudflats and prograded beachridges; acidic swamps are also common in ridge swales. Sand spits, created by longshore drift, are a less common but significant feature of the shoreline morphology of northern Deception Bay where they overlie tidal-sand flat deposits. These shoreline features are considered to be largely the product of the deposition of marine sands sourced from the northern tidal delta of Moreton Bay, with minor sedimentary input from the Caboolture River (Flood, 1979, 1980; Stephens, 1992).

In the context of MRAP, Deception Bay lies within the coastal biogeographic zone (Hall, 1980) or lowland “wallum” country (Coaldrake, 1961). This biogeographic zone is typified by a subtropical climate (cf Auclêmes, 1992), soils of low fertility, a vegetation pattern characterised by a mosaic of fluctuating ecotones and incorporating forest, woodland, grassland, heath, swamp and sedgeland communities; and a diverse fauna reflecting the variety of habitats within this zone (Coaldrake, 1961; Draper, 1980). It is an environment particularly abundant in estuarine fish and shellfish resources (Colliver & Woolston, 1979; Draper, 1980; Hall, 1982b; Pearce, 1993; Williams, 1992). Within Deception Bay these exploitable marine resources are complemented both by birds which frequent the coastal plain (Caboolture Shire Council, 1993) and by edible plants especially the abundant swamp fern Blechnum indicum, formerly a staple of coastal Aboriginal communities (Colliver & Woolston, 1979; Draper, 1980; Pearce, 1993; Petrie, 1992; Steele, 1970, 1972).

The local archaeological record of Deception Bay features a diverse range of site types including a ceremonial bora ground (Flood, 1990; McCarthur, 1978; Satterthwait & Heather, 1987), a possible stone-fish trap (Stockton, 1975; Walters, 1985), the well-documented Sandstone Point midden complex (Crooks, 1982; Hall, 1987; Hall et al., 1987; Nolan, 1986), a probable Blechnum processing site at Browns Road (Hall, 1987; Richter, 1994), and numerous undated shell middens (Hall, 1982a, 1987). The chronological evidence suggests that prehistoric occupation and resource exploitation of this environment has been confined to about the last 2,000 years (Nolan, 1986; Hall, 1987). This contrasts with a regional archaeology which indicates some level of prehistoric occupation of the coastal lowlands throughout the last 20,000 years (Neal & Stock,
Likewise sites in Deception Bay post-date evidence for Holocene occupation of some islands within the wider Moreton region namely Bribie Island (Smith, 1992) and Hope Island (Walters, *et al.*, 1987; Ulm *et al.*, 1995).

The late Holocene antiquity of archaeological sites within Deception Bay is, however, consistent with models of prehistoric subsistence for the Moreton region which emphasise an increase in exploitation of the coastal zone after 2,000 years ago (*cf.* Hall, 1982b; Hall & Robins, 1984; Hall, 1987; Hall & Hiscock, 1988; Hall & Bowen, 1989; Morwood, 1986, 1987; Walters, 1989, 1992a,b). Suggested causal factors of this increase include: a Late Holocene increase in social complexity which provided for an enhancement of the carrying capacity of existing resource zones (Morwood, 1986, 1987); a Late Holocene advance in fishery
practice which, allied with an increase in sedentism, allowed for a greater exploitation of the coastal zone (Walters, 1989, 1992a,b); and a Late Holocene onset to the permanency of occupation of the coastal zone by a naturally increasing population due to environmental factors particularly sea-level fluctuations and subsequent lag times in the stabilisation of the coastal resource zone (cf. Beaton 1985, and see Hall, 1987; Hall & Hiscock 1988; Hall & Robins, 1984). The interaction between past human groups and the coastal resource zone is therefore of critical importance to our understanding of the late Holocene archaeological record of Moreton Bay. Fundamental to such an understanding is an appreciation of the history of formation and relative stability of the coastal zone and its resource base. This paper presents summary results of a palaeogeographical analysis of the coastal environment of northern Deception Bay (Figure 2.2) which focuses on the evolutionary history of the bay. This coastal landscape evolution is considered in terms of its probable effect on the formation, preservation and current visibility of the known archaeological record.

Figure 2.2. The spatial relationship of present environmental features and Aboriginal cultural heritage items within northern Deception Bay. For reference the palynological sample site TP1, referred to in the text, is also depicted.

**THE EVIDENCE**

The palaeogeographical model outlined here is based on a number of lines of evidence (Table 2.1). Radiocarbon and thermoluminescence age determinations provide a chronometric framework for the geomorphological evolution of the bay, a framework directly comparable to the known antiquity of the local
and regional archaeological record. Pollen analyses have been used to elucidate the vegetation history of the area, and hence provide an indication of the prevailing environmental conditions throughout the period of known occupation of the area. Geochemical analyses provide further clarification of the past environmental history of the bay. Observations made of previously undocumented artefact scatters on accretionary sand ridges, in association with particle size analyses of these ridges, allow direct assessment of the effect of sea-level decline and shoreline progradation on the archaeological record. The new evidence outlined in this paper provides more chronometric and stratigraphic control with which to model environmental change then previously outlined for Deception Bay (Flood, 1980, 1981, 1983). Moreover, the model presented herein has been devised with particular regard to the local and regional archaeological record and hence is more applicable than sedimentologically based models to studies of human-environment interactions within the area.

A PALAEOGEOGRAPHICAL MODEL FOR THE COASTAL EVOLUTION OF DECEPTION BAY

A conceptual model of the Holocene palaeogeographical evolution of Deception Bay is depicted in Figures 2.3 to 2.8. The transgressive nature of the dunal sequence suggests that particular geomorphic processes were both intermittent and repeated. In this way the present nearshore tidal lagoon (Figure 2.9) is considered to be a modern analogue of past landscape elements. It is possible for example to consider such coastal lagoons as areas of relatively shallow water that have been partly or wholly enclosed from the sea by the formation of depositional barriers (Bird, 1994). Further, providing nearshore waters are shallow, and there is an abundance of unconsolidated sediment on the sea floor, it is possible for wave action to build up a barrier while sea level remains stable, or even during a slow marine transgression (Bird, 1994, p.22). Within Deception Bay longshore drift presently promotes the formation of sand spits parallel to the present shoreline (Flood, 1981). This present mode of sand spit formation, coupled with an onshore wave climate that operates to deposit mobilised sediments along the shoreline (Patterson & Witt, 1992) is probably sufficient to promote the formation of a sand barrier behind which a future coastal lagoon could form.

The occurrence of mangrove species within sediments presently situated landward of a major mid-Holocene dune, as at Bribie Industrial Sands, suggests that a tidal lagoon similar to the present Bayside Drive Lagoon was located there in the past. It is considered here that this lagoon was initiated during a period of static to steadily rising higher sea level, sometime after 6000 years ago, at which time it had a similar northern outlet to the coast as the present Bayside Drive Lagoon. As marine sediments continued to be supplied to the coastline they accumulated along the northern channel of this older lagoon reducing its areal extent and ultimately isolating it from the tidal regime. Subsequent sea-level falls, coastal progradation and aeolian sand transport resulted in this lagoon becoming both emergent and far removed from the present coastline.
ARCHAEOLOGICAL IMPLICATIONS OF A REVISED HOLOCENE COASTAL EVOLUTION MODEL FOR DECEPTION BAY

The Holocene geomorphic evolution of northern Deception Bay has several implications with regard to the formation, preservation and interpretation of the archaeological record of the area. The first implication of a mid-Holocene evolution of the present dunal features of northern Deception Bay is that it is unlikely that evidence of early Holocene or late Pleistocene occupation of the coastal lowlands could be found in this region. Indeed, if Pleistocene occupation occurred in this area it would be now overlain by several metres of Holocene dunal sands (cf. O’Flynn, 1992, p.59)

A second geomorphic influence on the archaeological record of the area results from wind-transported sands (aeolian sands) being deposited over previously formed beach sand dunes (Cotter, 1995a & unpublished data). Artefactual material has been observed eroding out of a drainage channel within Bribie Industrial Sands, and being unearthed by bulldozing of sand deposits in the same area (Cotter, 1995b, 1995c). Likewise Beachmere residents have recovered artefacts from ‘fill’ sand quarried locally. These observations suggest that wind transported sands have covered some elements of the regional archaeological record. This clearly has implications with regard to site visibility and determination of the antiquity and status of sites within the area. It is likely, for example that the oldest sites in the area are those furthest removed from the coast, and consequently those most likely to have been subject to burial by aeolian sands.

Thirdly, the palaeobotanical evidence suggests that the tidal lagoon system presently featured along the Deception Bay shoreline is a modern consequence of an intermittent but repeated geomorphic process operational in the area throughout the mid to late Holocene. It is probable therefore that the resource zones presently observable within Deception Bay (including estuarine mudflats, tidal lagoons, and Melaleuca swamps) existed in some form throughout the last 5,000 years. This apparent longevity of the estuarine resource zone is in contrast to the younger antiquity of known archaeological sites within Deception Bay (Hall et al., 1987). It can be supposed that the land surface upon which the Sandstone midden complex exists, for example did not develop until a late Holocene coastal progradation occurred. Nevertheless a lack of known archaeological sites between 2,000 to 5,000 years old in the more landward dunal sequence of Deception Bay cannot be explained by either a late evolution of the land surface nor by a lack of suitable resources for Aboriginal exploitation.
Figure 2.3. Deception Bay shoreline c. 6,000 BP. At this time sea-level was about stable with present levels but water encroached further landward than at present. This westerly extension of marine conditions resulted because Moreton Bay was at this time a flat coastal plain with no previous coastal features of Holocene age to act as impediments to inundation. The early Holocene ridge (TL-dated to c.10,000 BP) can be explained as either (a) an Aeolian feature marking the westerly boundary of an early Holocene arid phase when sea-level was still 30m below present levels (Stephens 1986) or (b) the foreshore of a still to be formed tidal lagoon in which the date provided by TL methods is an overestimate. It is certain that this dunal feature is not of late glacial age as previously thought.

Figure 2.4 Deception Bay shoreline c. 5,200 BP. At this time sea-level was stable to slowly rising above present levels. Marine Sediments supplied from the north entrance tidal delta were entrapped within the northward onshore currents circulating along Deception Bay and thus promoted the formation of sand spits seaward of the immediate shoreline. As sedimentation increased these spits became sand barriers and ultimately formed a new shoreline which was then stabilized by dune colonizing vegetation. On the lee slope of this ‘barrier dune’ rainfall runoff from the nearby Landsborough Sandstone Ridge accumulated in ephemeral freshwater pools.
Figure 2.5. Deception Bay shoreline c. 4,600 BP. At this time sea-level, or at least the tidal regime, was higher than at 5,200 BP. The coastal ‘barrier dune’ which began to forming around 800 years prior to this was significantly breached in its northern section adjacent to a probable palaeochannel. The newly inundated area behind this coastal dune barrier, with egress to the tide, became a coastal lagoon dominated by mangroves.

Figure 2.6 Deception Bay shoreline c. 3,500 BP. At this time sea-level remains at about the height it attained c. 4,600 BP, however constant sediment deposition along the shoreline begins to cause siltation at the tidal lagoon inlet and consequently the areal extent of the lagoon begins to decline. Sand also begins to accumulate slightly seaward of the shoreline as sand spits across the coastal plain.
Figure 2.7. Deception Bay shoreline c. 2,500 BP. A rapid decline in sea-level at c. 3,000 BP completely isolates the former tidal lagoon eliminating mangrove taxa from the area. In this still predominately low lying area *Melaleuca* backswamp conditions develop and expand. The sea-level decline exposes marine sand of the coastal plain to wind transport and these sands are deposited both in the swales between the barrier dunes and on top of these sand ridge features. The shoreline begins to prograde seawards as sediment supply to the shoreline is maintained, and sea-level continues to decline to present levels.

Figure 2.8. Deception Bay shoreline at present. Today Bayside Drive Lagoon is in a phase of retreat as siltation of the inlet zone restricts seawater influx to major spring tides. From the dating evidence it appears that this Lagoon formed sometime within the last 2,000 years under similar conditions to a previously noted paleolagoon (Figure 2.5 above). The continued deposition of sand as spits seaward of the present coastline suggests that a 'barrier dune' behind which a future lagoon may develop.
As previously suggested the deposition of aeolian sands over archaeological materials deposited on dunal surfaces may provide at least one environmental reason for the lack of observed sites of more than 2,000 years old in the area. Within Deception Bay the major sand ridge which runs parallel to the coastline (and dated to about 5,000 years ago) is the landscape element most likely to have evidence of Aboriginal occupation for the period 5,000 to 2,000 years ago. However grain size analyses, and some material remains suggests that the evidence for human occupation of these dunes, at this time, has been covered by wind-blown sands derived from newly exposed coastal plain sand sheets. Subsurface investigations are required to firmly establish the antiquity of sites within Deception Bay.

Finally, aspects of the archaeological record suggest that geomorphic evidence alone will not adequately explain the complexity of past social relations within Deception Bay. This is best emphasised with reference to stone artefacts. Within northern Deception Bay stone artefacts found in the area cannot be sourced, for example, to the unconsolidated sediments of the estuarine mudflats or prograded dunes of the coastal plain. In addition, although archaeological excavations at Sandstone Point (Hall et al., 1987; Nolan, 1986) indicate that the majority of raw materials types identified can be sourced to the local area, four raw materials identified at this site (i.e. trachyte, chert, chalcedony and an unidentified volcanic) were not locally-derived (Nolan, 1986). Similarly, at nearby Beachmere, Wallin (1994) identified andesite, tuff and trachyte artefacts during a field survey; and rhyolite and greywacke have been noted in this study (Cotter, unpublished data). These raw materials are not local to the area although outcrops of these rock types occur within a 60 km radius of Beachmere (O’Flynn et al., 1983). Thus artefacts found within the dunal systems of northern Deception Bay must have been transported; and some of these artefacts must have been procured beyond the local area. The notions of ‘transport’ and ‘source distance’ are important in the understanding of resource utilisation by, and social interaction between, prehistoric groups (see McNiven, 1993 for relevant discussion of this issue). It is also notable that of the artefacts found within Northern Deception Bay specialised tools such as bevelled pounders and ground edged axes have been manufactured from exotic raw materials (Wallin, 1994; Cotter, unpublished data). It can be suggested that items such as ground edge axes and bevelled pounders required more curation than simple flakes and being manufactured from exotic raw materials they were ‘prestige items’ included in a trading network which incorporated the local Ningi-Ningi clan (Steele, 1972, 1984; cf. Nolan 1986, pp. 9-15) and other clans whose territories contained the exotic raw materials found within Deception Bay. Interestingly, Crosby & Hodge (1968, p.20) note that for south east Queensland, “...coastal groups often occupied land for some distance inland and at initiations or festivals like the bunya nut season...boomerangs made in the lowland areas were traded with Toowoomba groups for stone axe heads”. Detailed petrographic analyses of both exotic raw materials and likely source materials, coupled with ethnographic and socio-linguistic studies of Aboriginal social networks, would be needed to confirm the range and extent of the trading networks involved.
CONCLUSION
For the Holocene period dynamic geomorphic processes operated within Deception Bay to produce a coastal landscape abundant in exploitable marine, tidal lagoon and swamp resources for most of the last 5,000 years. This contrasts with an archaeological record which to date, is less than 2,500 years old. A model of late Holocene coastal progradation provides explanation for the relatively young nature of archaeological sites immediate to the present foredune. Aeolian deposition of sands on mid-Holocene accretionary ridges may explain the lack of dated archaeological sequences for the period from 2,500 to 5,000 years within the area. Sites may simply be buried under sand deposits. However, whereas this environmental history provides some explanation of both spatial and temporal patterns in the archaeological record, detailed ethnographic accounts and aspects of the archaeological record (e.g. exotic raw materials and ceremonial bora grounds) suggest that geomorphic evidence alone will not adequately explain the complexity of past social relations within Deception Bay. The formulation of explanations of the Deception Bay archaeological record is best considered in the context of a cultural landscape approach whereby palaeoenvironmental, ethnographic and archaeological data are integrated.
Table 2.1. Summary of evidence used to model the Holocene coastal evolution of northern Deception Bay, southeast Queensland (from Cotter, in prep.). The standard C14 age determinations are conventional age as reported by the NWG Macintosh Centre for Quaternary dating, Sydney University. The AMS dates as reported by AINSE are also conventional age determinations. The TL-dates are as reported by the Thermoluminescence Dating Laboratory, Department of Geography, University of Wollongong and the values shown assume secular equilibrium for both the U and Th decay chains. The uncertainty levels indicated for all dates represent one standard deviation.

<table>
<thead>
<tr>
<th>Type of Evidence</th>
<th>Sample Location</th>
<th>Material type</th>
<th>Age determination (Lab Code)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C14 age determination (Standard)</td>
<td>Bayside Drive Lagoon Beachmere NQ 084 024</td>
<td>Shell material of Notispisula spp. e.g. N. trigonella</td>
<td>2370 ±100 years (Beta -83926)</td>
<td>Shell material forming conspicuous layer (to 50% shell) in very dark-grey, finely granular, silty sand. Situated at or below the base of lagoonal sediments at a depth 119-127cm below surface sediments.</td>
</tr>
<tr>
<td>C14 age determination (Standard)</td>
<td>Sand ridge at intersection of Wallace and Beachmere Roads NQ 036 003</td>
<td>Shell material of Notispisula spp. e.g. N. trigonella</td>
<td>5190 ± 90 years (Beta-85415)</td>
<td>Shell material forming conspicuous layer (to 50% shell) in grey coarsely granular sands with some orange mottling and some silt. Located 220-230cm below surface sediments of sand ridge to height of 5m AHD.</td>
</tr>
<tr>
<td>C14 age determination (AMS)</td>
<td>Test Pit 1 Bribie Industrial Sands NQ 085 047</td>
<td>Humic clayey sands</td>
<td>5800 ± 50 years (OZA388)</td>
<td>At top of a dark grey clayey sand layer exhibiting distinctive yellow colouration on exposed surfaces (cf. Sulphur mineral), with yellowish brown mottles and quartz gravels towards base, at an approximate depth of 104-114cm below ground surface RL of 2.55m AHD.</td>
</tr>
<tr>
<td>C14 age determination (AMS)</td>
<td>Test Pit 1 Bribie Industrial Sands NQ 085 047</td>
<td>Humic sands</td>
<td>4600 ± 50 years (OZA 387)</td>
<td>At base of a dark grey to black sandy silt layer, at an approximate depth of 96 -104cm below ground surface RL of 2.55m AHD. This layer is associated with a marked vegetation change from mangrove species to dune colonising and freshwater swamp species (i.e. Phase II, below).</td>
</tr>
<tr>
<td>TL age determination</td>
<td>Nging swamp environs NQ 081 049</td>
<td>Sands</td>
<td>211000 ± 42000 years (W1941)</td>
<td>Mostly fine whitish sands from depth 140-180cm below surface levels of sand ridge of height c. 5m AHD.</td>
</tr>
<tr>
<td>TL age determination</td>
<td>Sand ridge exposed in cleared pine plantation NQ 058 036</td>
<td>Sands</td>
<td>10200 ± 1300 years (W1943)</td>
<td>Very finely granular brown to grey sands with some silt, depth 100-180cm below surface levels of sand ridge of height c. 3m AHD.</td>
</tr>
<tr>
<td>TL age determination</td>
<td>Sandridge near the intersection of Wallace and Beachmere Roads NQ 036 003</td>
<td>Sands</td>
<td>14900 ± 3300 years (W1942)</td>
<td>Very finely granular brown sand with some silt changing to moist medium coarse grey sands at base. Situated at 149-189cm below surface levels of sand ridge of height c. 5m AHD. These sands overly Notispisula shells dated to 5190 ± 90 years BP and consequently are considered to be of an improbable age</td>
</tr>
<tr>
<td>Geochemical evidence</td>
<td>Test Pit 1 Bribie Industrial Sands NQ 085 047</td>
<td>Clayey sands</td>
<td>c. ≥ 5800 years BP</td>
<td>Sediments of pH ≤ 3.5 and total sulphur content at 2% indicative of acid sulphate soil conditions and thus probably reflective of a past marine transgression (Melville et al., 1993), associated with sediments which contain mangrove pollen.</td>
</tr>
<tr>
<td>Type of Evidence</td>
<td>Sample Location</td>
<td>Material type</td>
<td>Age determination (Lab Code)</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------------</td>
<td>---------------</td>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Palaeobotanical evidence</td>
<td>Test Pit 1</td>
<td>Fossil pollen</td>
<td>Phase I c. 6000 yrs BP</td>
<td>Low frequency of mangrove pollen (Rhizophoraceae) at depth of 118-140cm below ground surface.</td>
</tr>
<tr>
<td></td>
<td>Bribie Industrial Sands</td>
<td></td>
<td>Phase II c. 5800 yrs BP</td>
<td>Decline to absence of mangrove pollen types, increase in dune colonising vegetation, (i.e. Casuarina, Poaceae, Monotoca and Banksia) and an increase in freshwater swamp types (i.e Restionaceae, Myriophyllum, Cyperaceae), at depth of 95-117cm below ground surface.</td>
</tr>
<tr>
<td></td>
<td>NQ 085 047</td>
<td></td>
<td>to ≤ 4600 yrs BP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Phase III ≤ 4600 yrs BP to ??</td>
<td>Return to dominance of mangrove pollen types particularly Aegiceras spp. with Avicennia spp. and Rhizophoraceae also present, at depth of 50-95cm below surface levels.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Phase IV undated</td>
<td>Transitional phase marking decline of mangrove species, and the influx of grass and sedge species, at depth of 30-50cm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Phase V undated</td>
<td>Period of establishment of Melaleuca swamps at TP1 site, at depth of 0-30cm below ground surface.</td>
</tr>
</tbody>
</table>
CHAPTER 3

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND I

THE GEOMORPHOLOGICAL CONTEXT OF ABORIGINAL CULTURAL HERITAGE PLACES: A CONTRIBUTION TO THE PROPOSED BEACHMERE (EXTRACTIVE INDUSTRY) DEVELOPMENT CONTROL PLAN.

Maria Cotter
*Centre for Coastal Management, School of Resource Science and Management, Southern Cross University, Lismore NSW.*

*Unpublished report*


**Concept and design of research**

Concept & project design: Cotter, M.M.

**Collection, analysis and interpretation of data**

Analysis and interpretation of data: Cotter, M.M.

**Writing**

Writing, proof reading and edits: Cotter, M.M.
CHAPTER 3

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND I

PART 1: THE GEOMORPHOLOGICAL CONTEXT OF ABORIGINAL CULTURAL HERITAGE PLACES: A CONTRIBUTION TO THE PROPOSED BEACHMERE (EXTRACTIVE INDUSTRY) DEVELOPMENT CONTROL PLAN.

INTRODUCTION
This report is written in response to a request by Dr Jay Hall of the Anthropology and Sociology Department of the University of Queensland, to present the geomorphological context of Aboriginal cultural heritage sites within Deception Bay, southeast Queensland. Geomorphic evidence is presented to highlight the role that recent landscape evolution has played in the formation and preservation of the archaeological record within the area, particularly for the area defined as northwestern Deception Bay (see: Flood, 1980). It is expected that the geomorphic evidence will compliment known features of the ethnohistorical and archaeological record and thereby assist in meeting the cultural heritage survey requirements outlined in the Proposed Beachmere (Extractive Industry) Development Control Plan Brief (Caboolture Shire Council, 1994).

THE PRESENT LANDSCAPE
Within southeast Queensland Deception Bay forms the most northern mainland coastal element of the larger Moreton Bay. Deception Bay has evolved as a tidal embayment, protected to the east from high energy, oceanic wave action by three barrier islands namely Bribie Island, North Stradbroke Island and Moreton Island. Throughout Moreton Bay the wave climate is dominated by wind direction rather than the predominantly northeasterly swells. As a consequence waves in Deception Bay are typically produced by prevailing south-east and southwesterly winds (Stephens, 1992). These winds, in the absence of strong tidal currents, raise water-levels and promote a northward current to circulate along the Deception Bay shoreline (Patterson & Witt, 1992).

The present landscape of northern Deception Bay can be broadly described as consisting of unconsolidated alluvium, colluvium and coastal plain sediments deposited within the last 2 million years (the Quaternary period). The alluvial and colluvial deposits are considered to be derived from older terrestrial sediments, particularly the Mesozoic Landsborough Sandstone which outcrops in the
area, as evidenced by the wave-cut cliff and platform that defines Sandstone Point (Ferguson, 1969). In contrast, the coastal plain, which consists of estuarine mudflats and prograded beach ridges, is considered to be largely the product of the deposition of marine sands sourced from the northern tidal delta of Moreton Bay; with minor sedimentary input from the Caboolture River (Flood, 1979, 1980; Stephens 1992). In addition, Flood (1980) noted that sand spits, created by longshore drift, extended southward of Beachmere and northward near Godwin Beach to overlie tidal-sand flat deposits.

**QUATERNARY LANDSCAPE EVOLUTION**

**THE AUSTRALIAN CONTEXT IN BRIEF**

Deep sea records indicate that the Quaternary represents a period of oscillating sea levels with a cyclic interval of approximately 100,000 years. (Williams et al., 1993) The present high sea level is not characteristic of the conditions prevailing for most of this timescale, but represents a period of deposition over a surface characterised by erosional processes. Chappell (1983, 1987) reported on data obtained from coral reefs in Northern Australia and New Guinea and presented a high resolution model of sea-level oscillations for the last 400,000 years. His model has become the basis for detailed analyses of coastal geomorphology developed for mainland Australia during the Late Quaternary. Sea level at the last glacial period (18,000 years ago) was 150m below present levels, rising rapidly during the interglacial period to near present levels by approximately 6000 years ago. The sea level attained during the Last Interglacial (125,000 years ago) was 2-6m above that achieved 6000 years ago. The replicability of eustatic fluctuations observed offers the opportunity to correlate depositional facies on a regional scale.

Investigations from southern Australia indicate that sediments deposited at the Last Interglacial persist up to 20m above present facies (Bowden & Colhoun, 1984; Murray-Wallace & Goede, 1990). These sediments indicate that the southern continental margin is tectonically active, rising during the Late Quaternary. The association between tectonism, orbital forcing and eustacy is demonstrated by Huntley et al. (1993, 1994) from thermoluminescence dating of coastal dunes and ridges along the South Australian coast. These series of dunes and ridges display a progressively younger trend towards the coast, corresponding to interglacial sea level stillstands that persisted at times over the last 700,000 years. An almost constant distance between successive ridges of 10km, and a level topographic surface, implies that the southern continental margin has risen by 50m over the last 700,000 years (Huntley et al., 1993). In comparison, eastern and northeastern Australia represent a stable continental margin where successive high sea levels have obliterated terrestrial evidence of all but the most elevated depositional facies attributable to previous interglacials (Woodroffe et al., 1992).

Surficial exposure of Last Interglacial sediments within Moreton Bay are restricted to the barrier islands of Moreton, North and South Stradbroke and Bribie Island (Tejan-Kella et al., 1990),
accretionary ridges at Bribie Island and Beachmere (Hekel & Day, 1976), and fluvial deposits bordering the Pine River (Hoffman, 1980). However, the shortage of material in situations suitable for meaningful dating and the limitations of available dating techniques restricts the identification and absolute chronostratigraphy of other deposits. The lack of such deposits is in agreement with the concept that Last Interglacial terrestrial sediments have been obscured by sediments deposited during the most recent sea level transgression (about 6000 years ago). Consequently subsurface investigations of the sediment facies of Moreton bay permits a chronostratigraphic relationship between sea level and sediment type to be established for the last 125,000 years.

**The Moreton Bay Evidence**

In 1972, a systematic mapping of the Marine Geology of Moreton Bay was commenced by the Geological Survey of Queensland (Jones & Hekel, 1979). Preliminary results of a soft sediment coring programme, combined with continuous seismic reflection profiling for the central part of the Bay were reported in 1976 (Hekel et al., 1976). Due to the fact that sediments attributable to the Holocene epoch (last 10,000 years) were very restricted in this section of the Bay, the present submarine topography was suggested to have originated during the Pleistocene epoch (2 million years to 10,000 years ago) during low stands of the sea. Further, distinct periods of subaerial exposure separated by periods of marine sediment deposition were envisaged (Hekel et al., 1976). Additional drilling in 1976 confirmed that erosional land surfaces of Pleistocene age had developed during periods of low sea level (between 10.8 to 38.7 m below Low Water Datum). Seismic data also indicated that Holocene sediments were not uniform within the Bay (thickness varying from 1-17 m) but that greatest accumulations occurred in small basins within the western part of the Bay (Jones & Hekel, 1979). Palmieri (1979) in an examination of ostracod and foraminiferal faunas obtained from marine sediments within Moreton Bay also provided evidence of past sea level fluctuations. He demonstrated that two major marine transgressive phases had occurred within the Bay one related to a Pleistocene interglacial phase and a second was considered to represent a basal Holocene transgression (Palmieri, 1979).

Several authors have thus promoted the view that sea level fluctuations during the Quaternary period exerted a major influence on the type and location of sedimentary facies within Moreton Bay, particularly during the Pleistocene where sea level movements were determined to have caused the repeated filling and emptying of the Bay (Hekel et al., 1976; Hekel et al., 1979; Jones & Hekel, 1979; Jones & Stephens 1981; Maxwell, 1970; Palmieri, 1979). In addition to sea-level fluctuations Jones & Stephens (1982) suggested that the age, distribution and nature of Quaternary deposits within Moreton Bay was influenced by bedrock headland configuration and sediment supply.

This view was further expanded by Heidecker & Whitehouse (1984) who attributed the form of the present landscape to underlying structural and tectonic controls. Their appraisal was that though the
detailed geometry of Moreton Bay was controlled by surficial factors such as drainage patterns, sea level fluctuations and wind direction, its gross form corresponded to a morphostructural framework set down prior to the Quaternary period. This view has in part been supported by a more recent seismic investigation of the Brisbane River Delta front and pro-delta (Evans, 1990; Evans et al., 1992). The major conclusion expressed in this more recent study was that throughout the Quaternary period sediment deposition in Moreton Bay had been controlled by sea-level fluctuations, stream channel migration and palaeo-topography.

**HOLOCENE SEA LEVEL DATA**

Various sea level curves for eastern and northeastern Australia indicate a rapidly increasing sea level reaching a Holocene stillstand at about 6000 to 6500 years ago (Belperio, 1979; Carter & Johnson, 1986; Crowley et al., 1990; Grindrod & Rhoades, 1984; Hopley & Thom, 1983; Thom & Chappell, 1975; Thom & Roy, 1983). An explanation for such a stillstand is provided from a glacio-hydro-isostatic model proposed by Lambeck and Nakada (1990) in which the height of maximum sea level rise is predicted to be +1-2m above the present level. Evidence for a rapid sea level rise has been derived from the continental shelf east of Moreton Bay. Stephens (1986) indicates that radiocarbon dates obtained from this area provide evidence for a 30m+ rise in sea level (from -60m to -30m) during the period between 11,900 and 9500 years ago, with an additional 30m rise occurring by about 6500 years ago. The evidence for a sea level 1-2m above present level at 6500 to 6000 years ago is more difficult to conclusively document.

**MID-HOLOCENE HIGH STILLSTAND**

**RADIOCARBON EVIDENCE**

Flood (1980, 1981) proposed a late Holocene coastal evolution model for Deception Bay based on radiocarbon age determinations of estuarine molluscan shells located *in situ* at the base of several dunes within the immediate vicinity of Beachmere. The sequence of events proposed by Flood (1981) was that sea level was at or above its present level about 6000 years ago, at 4700 years ago it was 0.7m higher than present and at 3,300 years ago it was still at a level 0.4m higher than present.

Mollusc shells (*Notospisula* *sp.*) from a core sample recently obtained from a prominent sand ridge at Wallace Road Beachmere (Grid Reference 036 003, Redcliffe 1: 50,000 Map Sheet) are believed to be of the same unit Flood (1981) reported at Grid Reference 042 010 (Redcliffe 1: 50,000 Map Sheet), and to which he attributed a corrected age of 5265 +/- 80 BP (SUA-1254). Recent radiometric analysis of the sample from GR 036 003 provided a conventional age of 5190 +/- 90 years BP (Beta 85415) for the shell material. X-ray diffraction of finely crushed *Notospisula* *sp.* shell material from this unit confirmed the presence of the mineral aragonite but provided no unique evidence of calcite indicating that these shells were mineralogically suitable for dating (see: Head, 1990; Stephens, 1986) and
therefore suggest that the age determination is reliable. As this age determination is consistent with Flood's data it lends support to his model of a higher sea level than present sometime after 6000 years BP (Flood, 1981).

**PALAEO-BOTANICAL EVIDENCE**

Additional evidence for a higher sea level has been derived from palaeo-botanical data obtained from sediments within test-pits excavated as part of sand extraction operations at Bribie Industrial Sands. Two pits (TP1 & TP17) have been investigated in detail, and at least two mangrove pollen types (*Avicennia* and *Aegiceras*) have been identified (Cotter, 1995a). These genus presently co-exist within the Pumicestone Passage (Batianoff & Elsol, 1989; Dowling, 1979, 1986) and therefore it is proposed that similar climatic and hydrological conditions to those which presently prevail in the Passage were experienced, in the vicinity of the Bribie Industrial Sands Extraction operation, sometime in the past. The reduced levels at the top of both excavation pits are 2.55 and 2.59 metres respectively hence sea-level would need to have been at least 1m higher to permit the noted deposition of mangrove pollen at 30cm below present ground surface (*i.e.* R.L of 2.25 & 2.28m) respectively. Accelerator Mass Spectrometry dating of organic material from TP1 from a depth of 1.14m produced an age of 5800 ± 50 years and at a depth of 1.04m produced an age of 4610 ± 50 years placing this higher sea level within the time frame suggested by Flood (1981).

**GEOCHEMICAL EVIDENCE**

Further supporting evidence for a higher sea-level comes from the reports of acid trending soils within the vicinity of the Bribie Industrial Sand Extraction site (Cotter, 1994; Sutherland & Amaral, 1994). Acid sulphate soil development occurs when sediments containing sufficient iron pyrite FeS₂ in aerobic conditions, oxidise to form sulphuric acid (Dent & Pons, 1993). Ultimately this oxidised pyritic soil becomes too acid (pH<3.5) for the inherent buffering capacity of sediments (*e.g.* alkaline clays or shell materials) to effectively neutralise it (Melville *et al.*, 1993). The accumulation of pyrite in soils is the initial requirement for the formation of acid sulphate soils, thus *potential acid soils* are soils which contain pyrite (Naylor, 1993). If these soils are maintained in a waterlogged (hence anaerobic) environment, acid generation will not occur. However if the pyrite is exposed to air (by drainage or soil excavation) it is oxidised, sulphuric acid is generated and *actual acid soils* conditions are produced (Naylor, 1993).

Melville *et al.* (1993) state that for iron pyrite to accumulate in the soil a relatively slow, bacterium catalysed set of chemical reactions must take place. These reactions are dependent on sufficient ferric iron (available in most sediments), a supply of sulfur ions, adequate organic material, and a generally anaerobic environment. As the availability of sulfur is critical to the process, coastal environments (because sea water is enriched with SO₄²⁻ ions) are primary sites for pyrite accumulation. The most favourable coastal locations for pyrite accumulation are tidally-inundated mud-flats supporting
mangrove communities. This is so because mangroves input large amounts of organic detritus into generally anaerobic marine muds which are regularly inundated with sulfur rich sea water (Melville et al., 1993). To a lesser extent brackish-water environments, and estuarine and coastal lake environments, given sufficient organic input to bottom sediments, can also accumulate iron pyrite. Since seawater is a primary requirement for the accumulation of pyrite in coastal sediments, it is not surprising that maximum pyrite accumulation is estimated to have occurred sometime after the mid-Holocene marine transgression between 7000 to 6000 years ago (Melville et al., 1993).

Cotter (1994) identified acid sulphate materials (pH < 3.5 & total oxidisable sulphur at 2%) in samples collected from a test-pit exposed to the north west of Bribie Industrial Sands (TP1 referred to above) during sand extraction operations. However as the sediment in the test-pit had been clearly exposed to the air it was likely to have undergone recent oxidation. Thus the data is not considered conclusive evidence for actual acid sulphate soils within the area, but rather, likely evidence for the existence of potential acid sulphate soils. In the context of possible sea-level rise it is notable that the acid trending sediments of TP1 contained mangrove pollen, were dated to about 6000 years ago, and were situated above present sea-level. When combined, these data suggest that within Deception Bay, optimal conditions for the formation of potential acid soils prevailed during a mid-Holocene sea-level rise. Confirmation of the presence of both actual and potential acid soils within the Beachmere area is derived from Sutherland and Amaral (1994:5) who maintain that waters obtained from existing sand extraction operations within the Beachmere area recorded pH values reflective of actual acid reaction materials.

**LATE HOLOCENE PROGRADATION**

Progradation of the Deception Bay coastline is considered to have occurred rapidly in response to a sea level decline. During this episode of progradation it is assumed that a similar interaction between riverine and tidal sediments fluxes, as is presently observed at Beachmere, occurred to produce a series of sand waves along the tidal sand flats (cf. Flood, 1980). Colonisation of these tidal sand flats followed further declines in sea level producing a coastal plain. The rate of shoreline progradation is estimated at between 500m and 1000m per 1000 years (Flood, 1980). Jones and Holmes (1986) indicate that the Boondall-Nudgee Beach coastal plain is less than 4140 years old, in agreement with interpretations by Hekel et al., (1979). The formation of the Beachmere-Godwin Beach coastal plain is estimated to have commenced after this time culminating in the development of a foredune at the present coastline of recent age.

In response to a sea level decline, an accretionary sand ridge developed approximately 1 km inland and parallel to the present coastline. This ridge is clearly evident on aerial photographs of the region and forms a major topographic and hydrologic feature. The subsequent exposure of the tidal sand flats seaward of this ridge system to aeolian processes has obscured much of the microtopography of the
sand flats with deposition occurring along the crest of this major accretionary ridge. Siemon (1994) identified foundry sand (sand with > 90% of the sample finer that 425μm in size) as existing within the top 1-2m along the crest of the major transverse progradational ridge of northern Deception Bay. Further, descriptions of sediments from the top 1-2m indicate that the sands are rounded and extremely well sorted, characteristic of aeolian transport. Similar fine sands have been recorded from the top 1.5m of this same sand ridge in the vicinity of Wallace Road, Beachmere (Cotter, unpublished data).

**IMPLICATIONS FOR CULTURAL HERITAGE**

**LIKELY ANTIQUITY OF SITES**

The Holocene geomorphic evolution of northern Deception Bay, as described above, has several implications with regard to the formation, preservation and interpretation of the archaeological record of the area. The first perhaps obvious implication of a mid-Holocene evolution of the present dunal features of northern Deception Bay is that it is unlikely that evidence for early Holocene or late Pleistocene occupation of the coastal lowlands will be found in this region. Indeed, if Pleistocene occupation occurred in this area it would be now overlain by several metres of Holocene dunal sands (cf. O’Flynn, 1992: 59)

**BURIAL OF ARTEFACT SCATTERS BY AEOLIAN SANDS**

A second geomorphic influence on the archaeological record of the area results from wind-transported sands (aeolian sands) being deposited over previously formed beach sand dunes. Artefactual material noted eroding out of a drainage channel within Bribie Industrial sands; artefacts unearthed by bulldozing of sand deposits in the same area; and anecdotal evidence of artefacts being recovered by Beachmere residents, (from sands purchased locally) suggest that these wind transported sands have covered some elements of the regional archaeological record. This clearly has implications with regard to site visibility and determination of the antiquity and status of sites within the area. Simply put, it is likely that the oldest sites in the area are those furthest removed from the coast, and consequently those most likely to have been subject to burial by aeolian sands.

**HUMAN BURIAL WITHIN SAND DEPOSITS**

Deception Bay and the Toorbul Peninsula is an area rich in archaeological sites inclusive of ceremonial grounds., It is likely (and in fact evident in the regional archaeological and ethnohistorical record) that mortuary practices, inclusive of burials, were conducted within the area (see Cotter, 1995b). Meehan (1971) indicates that sand ridges because they were easily dug were often used for burial purposes and it is highly probable that the unconsolidated dunal features of northern Deception bay were used for burials.
RAW MATERIAL TYPES IN ARTEFACT ASSEMBLAGES

SOURCE LOCATIONS

Within northern Deception Bay lithic tools found in the area cannot be sourced, for example, to the unconsolidated sediments of the estuarine mudflats or prograded dunes of the coastal plain; and by implication artefacts found within these dunal systems must have been transported. The notions of ‘transport’ and ‘source distance’ are important ones in the understanding of resource utilisation by, and social interaction between, prehistoric groups. In this way, for example, an artefact made of a raw material type sourced beyond the known tribal boundaries associated with its present location suggests that some interaction has occurred between people of different tribes.

Nolan (1986) in her analysis of stone tools obtained from archaeological excavations conducted at Sandstone Point indicated that of the eight raw material types identified, the majority could be sourced to the local area. Quartz, quartzite and silcrete, for example, occurred as river cobbles in gravel beds near Sandstone Point whilst mudstone, siltstone, sandstone and lateritic materials were immediate to Sandstone Point. Significantly these locally derived materials formed the majority of the artefact assemblage at the site. For example in excavation pit SSP2-B, 89.5% of the raw materials encountered were locally derived, either from the immediate Landsborough Sandstone outcrops or nearby alluvial gravel deposits (see: Nolan 1986, p80).

The remaining four lithic raw material types Nolan (1986) identified (trachyte, chert, chalcedony and an unidentified volcanic) are not reported to outcrop within the Toorbul Peninsula (see: Brisbane 1:100,000 Geological Map cf. Caboolture 1:100, 000 Geological Map). These materials cannot therefore be considered local to the Ningi-Ningi clan, the Aboriginal clan ethno-historically associated with this area (Steele, 1972; 1984 cf. Nolan, 1986, pp. 9-15). In addition Wallin (1994) identified andesite, tuff and trachyte artefacts during a field survey at Beachmere whilst rhyolite and greywacke have also been noted in artefactual material from the area (Cotter, pers. obs.). Whilst these raw material types are not immediate to the unconsolidated Quaternary sediments of Beachmere, and no detailed petrographic analyses have been undertaken to accurately determine their source, significant outcrops of these rock types are reported within an approximately 60km radius of the Beachmere area (O’Flynn et al., 1983) and hence within the perimeters of the wider Moreton region.

The most immediate notable source of trachyte is an outcrop occurring in the upper reaches of Lagoon Creek, a tributary of the Caboolture river, situated some 20km west-north west of Beachmere (O’Flynn et al., 1983). Other nearby outcrops are those associated with Round Mountain, The Saddle & Mt Miketeebymulghai. Minor pyroclastic deposits are reported as occurring within the nearby Rocksberg Greenstone Formation, whilst significant tuffaceous deposits are noted 20km to the southwest within the vicinity of Lake Kurwongbah, and within the Glass House Mountain area.
approximately 30km northwest of Beachmere. Significant outcrops of rhyolite are also noted to occur within the Mount Byron Volcanics, 30km to the west of Beachmere.

Chert is reported as a minor occurrence within the Kurwongbah beds but significant quarry resources are noted within the Neranleigh-Fernvale beds particularly near Mt England and around the village of Fernvale 60km southwest of Beachmere. Andesitic rocks are prominent within the Northbrook beds and the Neranleigh-Fernvale beds especially along the headwaters and upper tributaries of the Brisbane and Stanley Rivers to the west of Beachmere. Greywacke is also noted to occur within the Neranleigh Fernvale Beds with minor outcrops also occurring within the Bunya Phyllites to the southwest of Beachmere. A Greywacke source is noted near the headwaters of the South Pine River, in the vicinity of Mt Nebo which lies approximately 35km southwest of Beachmere (O’Flynn et al., 1983).

RAW MATERIAL UTILISATION AND EXCHANGE PATHWAYS.

Nolan (1986) has indicated that the majority of raw material types used for lithic tool manufacture in the Beachmere area were derived from local resources. Nevertheless some artefacts were made from materials beyond the Ningi Ningi clan boundaries (as drawn in Steele, 1984, p.122 & p.161). Items requiring more curation than simple flakes such as ground edge axes and bevelled pounders have been noted above to derive from materials (greywacke & andesite respectively) not present within the main geological formations of the Toorbul Peninsula and therefore indicate that they have been transported. Although the evidence is meagre it seems likely that these items being “prestige items” were part of a trading network which incorporated the Ningi-Ningi clan and other clans whose territories contained the raw materials found within the sites of the Beachmere area. Interestingly, Crosby & Hodge (1968, p.20) note that for south east Queensland “....coastal groups often occupied land for some distance inland and at initiations or festivals like the bunya nut season...... boomerangs made in the lowland areas were traded with Toowoomba groups for stone axe heads”. Detailed petrographic analyses of these extra-local raw materials as well as likely source areas are needed to confirm the range and extent of the trading networks involved.

LONGEVITY OF ESTUARINE RESOURCE ZONE

Throughout the Holocene, dynamic geomorphic processes have operated to produce the present physical landscape of Deception Bay. The transgressive nature of the dunal sequence observed suggests that particular processes were both intermittent and repeated. In this way the tidal lagoon immediately west of Bayside Drive, Beachmere, is considered to be a landscape feature produced by geomorphic processes operational both in the present and also operational sometime in the past.

Bird (1994) states that coastal lagoons are areas of relatively shallow water that have been partly or wholly enclosed from the sea by the formation of depositional barriers. He further states that providing
nearshore waters are shallow, and there is an abundance of unconsolidated sediment on the sea floor, wave action can build up a barrier while sea level remains stable, or even during a slow marine transgression (Bird, 1994:22). It has been observed that longshore drift has deposited sand spits parallel to the present shoreline at Deception Bay (Flood, 1981). This mode of sand spit formation, coupled with an onshore wave climate that operated to deposit mobilised sediments from the shallow coastal plain along the Deception Bay shoreline, would be sufficient to promote the formation of a sand barrier behind which a coastal lagoon could form. Indeed the initiation of a coastal sand barrier in this manner would promote the formation of a northerly outlet to the sea, since this would be the area furthest from the initial point of shore deposition involving a northward moving longshore drift.

The occurrence of mangrove species within sediments presently situated landward of a major mid-Holocene dune, as happens at Bribie Industrial Sands, suggests that a tidal lagoon similar to the present Bayside Drive Lagoon was located there in the past. It can be envisaged that this lagoon formed during a period of high sea level, about 6000 years ago, at which time it had a similar northern outlet to the coast as the present Bayside Drive Lagoon. It is envisaged that as sediments continued to be supplied to the coastline they accumulated along the northern channel of this older lagoon reducing its areal extent and ultimately isolating it from the tidal regime. Subsequent sea-level falls, coastal progradation and aeolian sand transport resulted in this lagoon becoming both emergent and far removed from the present coastline.

This notion of repeated landscape elements suggests that resource zones presently observable within Deception Bay (including estuarine mudflats, tidal lagoons, and *Melaleuca* swamps) probably existed in some form throughout the last 5000 years. The known antiquity of archaeological sites within Deception Bay is about 2300 years for the Sandstone Point midden complex (Hall et al., 1987). It can be supposed that the land surface upon which this midden complex exists did not develop until a late Holocene coastal progradation occurred. Nevertheless a lack of known archaeological sites between 2000 to 5000 years old in the more landward dunal sequence of Deception Bay can not be explained by either a late evolution of the land surface nor by a lack of suitable resources for Aboriginal exploitation.

As previously suggested the deposition of aeolian sands over archaeological materials deposited on dunal surfaces may provide at least one environmental reason for the lack of observed sites of more than 2000 years old in the area. Within Deception Bay the major sand ridge which runs parallel to the coastline and dated by Flood (1981) to about 5000 years ago is the landscape element most likely to have evidence of Aboriginal occupation for the period 5000 to 2000 years ago. However grain size analyses, and some material remains suggests that the evidence for occupation of these dunes by Aboriginal groups, at this time, has been covered by sands. Therefore to firmly establish the antiquity of sites within Deception Bay some subsurface investigations are probably warranted.
CONCLUDING REMARKS

In this report I have attempted to detail the general geomorphic features of Deception Bay and to relate these to the formation and preservation of the known archaeological record. For the Holocene period it is clear that dynamic geomorphic processes operated within Deception Bay to produce a coastal landscape probably abundant in exploitable marine, tidal lagoon and swamp resources for most of the last 5,000 years. This contrasts with an archaeological record which to date is less than 2,500 years old. A model of late Holocene coastal progradation can be used to explain the relatively young nature of archaeological sites immediate to the present foredune (such as at Sandstone Point); at no time prior to this during the Holocene did the coastal land surface have such an easterly exposure. Likewise aeolian deposition of sands on mid-Holocene accretionary ridges may, to some extent, explain the lack of dated archaeological sequences for the period from 2,500 to 5,000 years within the area; sites may simply be buried under sand deposits.

A cautious approach to the final determination of the nature and extent of the archaeological record of the area is warranted which makes some attempt to consider a subsurface component to the archaeology. In addition extra-local sources of raw materials procured for artefact manufacture, as well as ethnographic and archaeological evidence for the occurrence of large ceremonial gatherings in the area suggest that geomorphic evidence alone will not adequately accommodate the complexity of social relations of past human groups nor their impact on the formation and preservation of the archaeological record. An integrated, cultural landscape approach that considers the geomorphic, the archaeological and the ethnographic evidence for past human occupation of the area is recommended as a means of determining the scientific significance of cultural heritage places within Deception Bay.
CHAPTER 4

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND II

BRISBANE RIVER AND MORETON BAY WASTEWATER MANAGEMENT STUDY TASK HWQ

1.3: HISTORICAL CHANGES IN SEDIMENT TYPES.

Maria Cotter, Stephen Cotter and Bill Boyd
Centre for Coastal Management, School of Resource Science and Management, Southern Cross University, Lismore, NSW.

Unpublished report


Concept and design of research

Concept: Boyd, W.E. 50%; Cotter, M.M.50%

Project Design: Boyd, W.E. 50%; Cotter, M.M. 50%

Collection, analysis and interpretation of data

Collection of data: Cotter, M.M. 60%; Cotter, S.J. 40%

Analysis and interpretation of data: Cotter, M.M. 60%; Cotter, S.J. 40%.

Writing

Writing: Cotter, M.M. 100%

Proof reading and edits: Cotter, M.M. 80%; Cotter, S.J. 20%

Tables and Graphics Cotter –M.M. 100% (or as acknowledged in captions)
CHAPTER 4

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND II

BRISBANE RIVER AND MORETON BAY WASTEWATER MANAGEMENT STUDY TASK HWQ 1.3: HISTORICAL CHANGES IN SEDIMENT TYPES.

INTRODUCTION

This report documents the historical evidence for change in the distribution of the main sediment facies within the Brisbane River estuary and Moreton Bay. The objective of such a summary document is to provide base level information necessary for assessing the resultant impacts of anthropogenically altered hydrological regimes and catchment conditions. As such the focus of the report is on two separate but interrelated histories. Firstly, the study briefly reports the fluvial geomorphology and sedimentary stratigraphy of the lower Brisbane River and Moreton Bay. By placing the River’s evolution within this Late Quaternary (c. last 1.78 Million years) context, a greater appreciation of the magnitude and potential implications of altering the river’s hydrology can be grasped. The second focus of this report is to outline the changes in the channel geometry, flow regulation and sediment supply that have occurred within the historical period. Such modifications have had a profound effect upon the water quality over this time scale (see HWQ 1.1)6.

QUATERNARY LANDSCAPE EVOLUTION WITHIN MORETON BAY

Deep sea records indicate that the Quaternary represents a period of oscillating sea levels with a cyclic interval of approximately 100,000 years. (Williams, et al. 1993) The present high sea level is not characteristic of the conditions prevailing for most of this time scale, but represents a period of deposition over a surface characterised by erosional processes. Chappell (1983, 1987) reported on data obtained from coral reefs in Northern Australia and New Guinea and presented a high resolution model of sea level oscillations for the last 400,000 years. His model has become the basis for detailed analyses of coastal geomorphology developed for mainland Australia during the Late Quaternary. Sea level at the last glacial period (c. 18,000 years ago) was 150m below present levels, rising rapidly during the interglacial period to near present levels by approximately 6000 years ago. The sea level attained during the Last Interglacial (c. 125,000 years ago) was 2 to 6m above that achieved 6000

---

6 This report was included as a chapter within Historical trends in Water Quality (Task HWQ) Final report to the Brisbane and Moreton Bay Waste Water Management Study prepared by numerous staff of the Centre for Coastal management at Southern Cross University.
years ago. The replicability of the eustatic (sea level) fluctuations observed offers the opportunity to correlate depositional facies on a regional scale.

Surficial exposure of Last Interglacial sediments within Moreton Bay are restricted to the barrier islands of Moreton, North and South Stradbroke and Bribie Island (Tejan-Kella, *et al.* 1990), accretionary ridges at Bribie Island and Beachmere (Hekel & Day, 1976), and fluvial deposits bordering the Pine River (Hoffman, 1980). However, the shortage of material in situations suitable for meaningful dating and the limitations of available dating techniques restricts the identification and absolute chronostratigraphy of other deposits. The lack of such deposits is in agreement with the concept that Last Interglacial terrestrial sediments have been obscured and overlain by sediments deposited during the most recent sea level transgression (*c.* 6000 years ago). Consequently subsurface investigations of the sediment facies of Moreton Bay have been employed to determine the chronostratigraphic relationships between sea level and sediment type for the last 125,000 years. In fact beginning in the early 1970’s, and continuing to the present, several research projects (*e.g.* Evans, 1990; Evans, *et al.* 1992; Flood, 1979, 1981; Hekel, *et al.* 1976; Hekel, *et al.* 1979; Jones & Hekel, 1979; Jones & Stephens 1981; Palmieri, 1979) and a number of geological resource assessment studies (*e.g.* Hoffmann, 1980; Holmes, 1980; O’Flynn, *et al.* 1983; Trezise, 1980; Willmott, *et al.* 1978) have focused on various aspects of the geological and sedimentary history of the Brisbane River and surrounding Moreton Bay. A brief summary of these investigations and the information provided by them regarding the nature of sediment facies within the area is presented below.

**THE MORETON BAY EVIDENCE**

In 1972, a systematic mapping of the marine geology of Moreton Bay was commenced by the Geological Survey of Queensland (Jones & Hekel, 1979). Preliminary results of a soft sediment coring programme, combined with continuous seismic reflection profiling for the central part of the Bay were reported in 1976 (Hekel, *et al.* 1976). Due to the fact that sediments attributable to the Holocene epoch (last 10,000 years) were very restricted in this section of the Bay, the present submarine topography was suggested to have originated during the Pleistocene epoch (*c.* 1.78 million years to 10,000 years ago) during low sea levels. Further, distinct periods of subaerial exposure separated by periods of marine sediment deposition were envisaged (Hekel, *et al.* 1976). Additional drilling in 1976 confirmed that erosional land surfaces of Pleistocene age had developed during periods of low sea level (between 10.8 to 38.7 m below Low water Datum). Seismic data also indicated that Holocene sediments were not uniform within the Bay (thickness varying from 1 to 17m) but that greatest accumulations occurred in small basins within the western part of the Bay (Jones & Hekel, 1979). Palmieri (1979) in an examination of ostracod and foraminiferal faunas obtained from marine sediments within Moreton Bay also provided evidence of past sea level fluctuations. He demonstrated that two major marine transgressive phases had occurred within the Bay one related to a Pleistocene
interglacial phase and a second was considered to represent a basal Holocene transgression (Palmieri, 1979).

Several authors have thus promoted the view that sea level fluctuations during the Quaternary period exerted a major influence on the type and location of sedimentary facies within Moreton Bay, particularly during the Pleistocene where sea level movements were determined to have caused the repeated filling and emptying of the Bay (Maxwell, 1970; Hekel, et al. 1976; Jones & Hekel, 1979; Hekel, et al. 1979; Palmieri, 1979; Jones & Stephens 1981). In addition to sea level fluctuations Jones & Stephens (1981) suggested that the age, distribution and nature of Quaternary deposits within Moreton Bay was influenced by bedrock headland configuration and sediment supply. This view was further expanded by Heidecker & Whitehouse (1984) who attributed the form of the present landscape to underlying structural and tectonic controls. Their appraisal was that though the detailed geometry of Moreton Bay was controlled by surficial factors such as drainage patterns, sea level fluctuations and wind direction, its gross form corresponded to a morphostructural framework set down prior to the Quaternary period. This view has in part been supported by a more recent seismic investigation of the Brisbane River Delta front and pro-delta (Evans, 1990; Evans, et al. 1992).

The major conclusion expressed in this more recent study was that throughout the Quaternary period sediment deposition in Moreton Bay has been controlled by sea level fluctuations, stream channel migration and palaeo-topography. More significantly in the context of this review this study indicated that despite the successive sea level fluctuations that predominated the Quaternary history of Moreton Bay the same depositional environments existed throughout; and sediments of similar lithology were deposited. Likewise throughout the Quaternary the main erosive channels within Moreton Bay were the palaeochannels of the Brisbane & Pine Rivers (Evans, 1990; Evans, et al. 1992). Moreover these rivers, despite episodes of backfilling during marine transgressions appear to have broadly occupied the same channels throughout several cycles of sea level fluctuation. Thus the most recent sedimentary facies identifiable along the Brisbane River are a legacy of the transport, movement and redistribution of similar sediments throughout the Quaternary; and the effect of sea level fluctuation upon the final deposition of these sediments. The most recent change in sea level has been attributed to the Holocene, and it is this change, because of its link to sediment facies redistribution within the Brisbane River and Moreton Bay which is discussed below.

**HOLOCENE SEA LEVELS**

Various sea level curves for eastern and northeastern Australia indicate a rapidly increasing sea level reaching a Holocene stillstand at about 6000 to 6500 years ago (Thom & Chappell, 1975; Belperio, 1979; Hopley & Thom, 1983; Thom & Roy, 1983; Grindrod & Rhoades, 1984; Carter & Johnson, 1986; Crowley, et al. 1990). An explanation for such a stillstand is provided from a glacio-hydro-
isostatic model proposed by Lambeck and Nakada (1990) in which the height of maximum sea level rise is predicted to be +1-2m above the present level.

Evidence for a rapid sea level rise has been derived from the continental shelf east of Moreton Bay. Stephens (1986) indicates that radiocarbon dates obtained from this area provide evidence for a 30m+ rise in sea level (from -60m to -30m) during the period between 11, 900 and 9500 years ago, with an additional 30m rise occurring by about 6500 years ago. However as Table 4.1 indicates the Moreton Bay evidence is somewhat equivocal with respect to the timing and maximum elevation of the Mid-Holocene Marine Transgression (MHMT). Moreover there is not conclusive evidence that sea levels within Moreton Bay have remained stable subsequent to the MHMT. Flood (1980, 1981) in fact proposed a late Holocene coastal evolution model for Deception Bay (based on radiocarbon age determinations of estuarine molluscan shells located in situ at the base of several dunes within the immediate vicinity of Beachmere) in which sea level was at or above its present level about 6000 years ago, 0.7m higher than present at 4700 years ago and at 3, 300 years ago it was still at a level 0.4m higher then present. Supporting evidence for such fluctuations of sea level during the Mid-to-Late Holocene within Deception Bay comes from a recent palaeobotanical study within the area (Cotter, 1996). This study indicates that the sedimentary features which presently occur along the shores of Deception Bay (i.e. coastal lagoons, beach ridges, tidal mudflats, and sand spit deposits) have had an intermittent but recurring presence within the depositional framework of this prograding coastal plain, reflecting the operation of dynamic geomorphic processes within the Bay, throughout the Mid-to-Late Holocene.

Table 4.1. Dated evidence for Holocene sea level, Moreton Bay

<table>
<thead>
<tr>
<th>Location</th>
<th>Sediment Facies</th>
<th>Age Determination (Years B.P.)</th>
<th>Inferred sea level height (relative to present levels)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bribie Island</td>
<td>Fossil coral in sandrock just below MLW northern tip of island</td>
<td>6300± 500 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. ± 0m</td>
<td>Ward, et al. 1977</td>
</tr>
<tr>
<td>Bribie Island</td>
<td>Fossil mollusca in sandrock just below MLW northern tip of island</td>
<td>3890± 140 years&lt;sup&gt;b&lt;/sup&gt;</td>
<td>c. ± 0m</td>
<td>Ward, et al. 1977</td>
</tr>
<tr>
<td>Mud Island</td>
<td>An Acropora coral colony located at northeastern end of the island</td>
<td>4,600 ± 200 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. +1m (above present reef growth )</td>
<td>Jones, et al. 1978, Flood, 1983</td>
</tr>
<tr>
<td>Peel Island</td>
<td>In situ Favia coral colony located in open water on eastern side of Island</td>
<td>6,700±170 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. +1m (above living microatoll)</td>
<td>Hekel, et al. 1979</td>
</tr>
<tr>
<td>Pine River</td>
<td>Timber fragment of Eucalyptus propinquua in estuarine muds and silts 7.9km above present river mouth</td>
<td>8390 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. + 1.5m</td>
<td>Hoffman, 1980</td>
</tr>
<tr>
<td>Nudgee</td>
<td>Shell collected from stranded beach deposit</td>
<td>4850±105 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. +1m</td>
<td>Hekel, et al. 1979; Ward &amp; Hacker, 1982; Flood, 1983, 1984</td>
</tr>
<tr>
<td>Deception Bay</td>
<td>Anadara trapezia shell collected from beachridge</td>
<td>5790 ±90 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. ±0m</td>
<td>Flood, 1981</td>
</tr>
<tr>
<td>Deception Bay</td>
<td>Anadara trapezia shell abandoned intertidal flat</td>
<td>4685±145 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. +0.7m</td>
<td>Flood, 1981</td>
</tr>
<tr>
<td>Deception Bay</td>
<td>Anadara trapezia shell, abandoned tidal flat</td>
<td>3300± 100 years&lt;sup&gt;a&lt;/sup&gt;</td>
<td>c. +0.4m</td>
<td>Flood, 1981</td>
</tr>
</tbody>
</table>

<sup>a</sup> = Reported age determination for sample material subjected to conventional radiocarbon dating techniques.  
<sup>b</sup> = Reported age determination for sample material subjected to Uranium disequilibrium series dating techniques.  
MLW= Mean Low Water
Importantly the geomorphic history of Deception Bay as discerned from these studies assists in developing an understanding of the current origin and form of sediment types within the entire Moreton Bay. It does this by emphasising that subsequent to the last (Mid Holocene) marine transgression dynamic geomorphic processes have resulted in intermittent but recurring depositional regimes. If this notion is linked to the Holocene sea level data presented in Table 4.1 it is clear that the MHMT affected the whole of Moreton Bay but probably at variable rates across the catchment. As a consequence the deposition of sediments across Moreton Bay is likely to have been variable and the micromorphology of inlets and coastlines across the Bay critical to the ultimate deposition of specific sediment facies.

**HOLOCENE DEPOSITIONAL ENVIRONMENTS**

Three sediment facies are identified for Moreton Bay; a mud / sandy mud facies; a muddy sand facies and a clean sand facies (Maxwell, 1970). These facies occur in five depositional environments which have persisted within the Bay throughout the Mid-to-Late Holocene (Figure 4.1) irrespective of sea level fluctuations. The first of these depositional environments is the zone of sand and muddy sand deposition characteristic of the fluvial deltas of the Caboolture, Pine and Brisbane Rivers and of Tingalpa Creek. Next, extending beyond the front of the tidal deltas is the predominantly muddy depositional zone of the pro-delta front. This is the zone in which fine-grained suspended sediments brought down the river channels is deposited. The third depositional zone occupies the central part of the Bay and is termed the zone of minimal deposition in which only a thin veneer of Holocene muddy sands has been deposited. The fourth depositional environment consists of marine sands and occupies tidal deltas in the eastern portion of the Bay, notably at the North Entrance and South Passage. The final depositional environment noted for Moreton Bay is that occupied by fringing coral reefs.

Understandings of the historical changes in sediment types within Moreton Bay and the Brisbane River must work from the knowledge that throughout the Holocene the Brisbane River has debouched sands and muds into Moreton Bay which have accumulated in the above mentioned delta and pro-delta front depositional zones. Holocene fluctuations in sea level subsequent to the MHMT, where apparent, are considered not to have reduced deposition at these zones although variation in the timing and extent of deposition at tidal margins would be expected. Additionally the response of microenvironments within the Bay to the deposition of similar sediment facies is likely to have been variable and consequently the thickness and extent of similar sediments is likely to vary across the Bay.

**THE BRISBANE RIVER: THE GEOMORPHIC EVIDENCE**

Beckmann and Stevens (1978) describe the geological constraints that have impinged upon the development of the Brisbane River system since at least 10 Million years ago. One fundamental issue arising from their paper (supported most recently by the studies of Evans et al. 1990, 1992) is the un-
Understanding that the Brisbane River has occupied its existing river valley for all of the Quaternary time period (the last 1.78 Million years; Jones, 1996), despite the rapid oscillations in eustasy over this time (Chappell, 1983; Chappell, et al. 1996). Moreover, the physiography of the region indicates an even greater antiquity for the Brisbane river valley with the bedrock meanders of the lower Brisbane river being features, inherited by superposition, from at least Tertiary times (Beckmann & Stevens,
These bedrock meanders reflect the entrenchment of the Brisbane River which consequently is unable to react to flow variables by adjusting its channel pattern (Holmes, 1980). Instead the river responds to changes in flow by alteration of its bed morphology into appropriately spaced pool and riffle sequences such that each reach contains at least one pool-riffle sequence (Holmes, 1980). Oxley in his survey of the Brisbane River during 1824 described one such sequence encountered near Pine Mountain:

*The river here between the banks was a full quarter of a mile wide; the channel through which the water flowed not more than 30 yards; the remaining waters of the stream, entering the pebble shoals flowed under them, and again emptied themselves into the deep reaches which invariably lay between the rapids* (Oxley, September 21st 1824; cited in Steele, 1972:138).

Sargent, (1978) and co-researchers Bartlett (1972), Keys (1972), Hughes (1972) and James (1978) applied side scanning sonar techniques to survey the gross channel bed morphology from the Bremer-Brisbane river junction to downstream of the city reach. Their findings indicate that the characteristic pool-riffle sequences of the Brisbane River are complicated within sections of the river by the presence of narrow bedrock gorges. These gorge sections are relatively deep, constrained laterally and/or vertically by basement rocks (*e.g.* at Seventeen Mile Rocks); with relatively higher stream velocities; and juxtaposed by low stream velocity, pool sections. Scour of the channel bed during above average river flows is a characteristic feature of the gorges where material is transported into the pool sections.

Riffles or shoals develop at the exits to these bedrock gorges where the reduction in stream velocities leads to deposition of the coarser sediments. Deposition of the finer sediments continues throughout the pool sections leading to gradational changes in the proportion of gravel to sand in the downstream direction. Superimposed upon the channel bed are large scale “megaripples” which align transverse to the flow direction. The amplitude of these megaripples decreases in the downstream direction, further indicating the reduction in stream velocity through these pool sections of the river (Sargent, 1985).

As previously indicated the present sea level is not the normal base level for the Quaternary period, but represents a brief highstand (Jones, 1992; Stephens, 1992). The coarse sediments that mantle the present Brisbane River channel were transported into the lower reaches during a time of lower sea level where the river was incising into the flood plain (Stock & Neller, 1990). The greater stream power associated with the increased stream gradients at that time enabled coarse sized clasts to be entrained within the bedload of the river whereas the river gradients across the relatively horizontal sand plains of the continental shelf were too shallow for the palaeo-Brisbane River to maintain the transportation of the coarse gravels. The extensive flood plain river terraces that presently line the Bremer and Brisbane rivers were deposited during periods of lower sea level where the hydrological regimes surpassed the contemporary situation. Alan Cunningham provides a useful description of one such terrace he encountered along the River during 1824:
... we were brought to a low point proceeding from the right bank, over which, when the river is flooded, heavy and impetuous Torrents have evidently passed, leaving a considerable deposit of sand and pebbles which had formed a short distance above, an extensive Bank, 20 feet high ¼ths of the Channel, and thus confining the Stream which was contracted to 50 yards and very shoal, to flow over a lower bed under the left bank. (Alan Cunningham, 19th September, 1824; cited in Steele, 1972:159).

The limited soil development and lack of recent clastic accretion upon these terraces indicates that they represent relatively stable features within the landscape. These river terraces are currently the major source of exploitable gravels for the Brisbane metropolitan area (Holmes 1978, O’Flynn, 1992).

Today, under normal flow regimes, coarse sand and gravel do not reach the river mouth but occur within the Brisbane River from above the tidal limit to New Farm (Stephens pers. comm.). Extensive drilling within the river channel by Holmes (1978, 1979) indicated sand to fine gravel grade vertically into coarse gravel and bedrock at depths ranging between 4 and 10 m within the riffle sequences of this portion of the Brisbane River. Whereas, at the river mouth, fine sand and mud form an extensive delta of tidal flats topped by low beach ridges and fronted by a prodelta mud apron (Stephens pers. comm.). Lang (1861) made some pertinent observations with regard to changing sedimentary regimes and these deltaic sediments. He suggests that the deposition of river sediments promotes the formation of mud banks and allows for the encroachment of the river into the bay, especially where these mud banks are colonised by mangrove species:

There happened to be an unusually high tide the first time I crossed the bay, in November 1845; and in many places, as we steamed along in the deep water channel, I was not a little astonished at first, till a moment’s reflection served to explain the phenomenon, at observing one or two solitary mangrove trees growing, as it were, out of the sea, to the right and left. But the places where these trees were growing were mere mud banks, very seldom underwater. From the same cause the Brisbane River is evidently pushing forward its banks into the bay, and forming additional dry land on either shore for future generations;... (Lang, 1861:60).

Significantly this deposition of mud and sand facies into the Bay, and resultant encroachment of landsurface into the marine environment, has been a feature of the River system throughout the Mid-to Late Holocene (Jones, 1992). Stephens (1992) in fact estimated that the long term supply of mud to Moreton Bay by the Brisbane River over the past 6500 years to be about 175,000 tonnes per year. He has also noted that the area of fine sand from Hamilton to Fishermans Island to Shorncliffe is estimated at 9300 hectares with an average thickness of 2.5m which requires an average rate of deposition of 50,000 tonnes per year over the past 6500 years for emplacement (Stephens, pers. comm.)

The Brisbane River channel bed can thus be considered to comprise two distinct sedimentological sections, an upstream section of coarse gravels representing an inherited sedimentary deposit from
about the Hamilton reach to below the Mt Crosby weir and a sandy to muddy sand facies that comprises the lower reaches, delta and surficial deposits of Moreton Bay (Jones, 1992). This natural distribution of sediments within the fluvial system of the Brisbane River however has become increasingly modified by anthropogenic influences, particularly in the historic period where regulatory and extractive measures (largely adopted for economic gains) have significantly altered the channel morphology. The major anthropogenic influences on the channel morphology of the Brisbane River are outlined below.

**ANTHROPOGENIC INFLUENCES ON SEDIMENT FACIES IN THE BRISBANE RIVER AND MORETON BAY**

**THE PREHISTORIC PERIOD**

Archaeological investigation of a prehistoric aboriginal midden situated near Wallen Wallen Creek on North Stradbroke Island, Moreton Bay has established a 20,000 year record of human occupation for the region (Neal & Stock, 1986; Hall & Hiscock, 1988). Wallen Wallen Creek however is the only archaeological site in southeast Queensland that has a record of human occupation which extends into the Pleistocene (Hall & Hiscock 1988; Hall 1990). All other known offshore island sites, with the exceptions of Hope Island (c. 4500 years old; Walter, et al., 1987) and Bribie Island (c. 3300 years old; Smith 1992), are less than 2500 years old. Similarly within the coastal zone, although sites such as the New Brisbane Airport site (c.4000 years old; Hall & Lilley, 1987) reflect a Mid Holocene occupation, most sites are first occupied only within the Late Holocene, typically during the last 1500 years (Ulm, et al., 1995).

The nature and timing of prehistoric human occupation patterns within Moreton Bay, and in particular the generally recognised trend towards a Late Holocene increase in site number and / or site use within this coastal zone (Hall & Hiscock, 1988; Hall & Robins 1984; Nolan 1986; Walters 1989, 1992a,b), have in part been attributed to the effects of sea level change on sediment facies within the Bay (Hall 1987, 1990). The typically Mid-to-Late Holocene occupation of the coastal zone is considered to reflect the development of a littoral resource base within Moreton Bay after the cessation of the Mid-Holocene Marine Transgression c. 6500 years ago. The frequent occurrence within prehistoric middens of shellfish such as *Anadara trapesia*, a bivalve which inhabits intertidal /subtidal mudflats and sea-grass beds (Catteral & Poiner, 1984), supports this view. More importantly, the occurrence of *Anadara trapesia* within dated archaeological deposits provides proxy evidence for the Mid-to-Late Holocene emplacement of mud and muddy sand facies along the shoreline of Moreton Bay. In light of the previous discussion on Holocene depositional environments within Moreton Bay, this emplacement of mud and muddy sands attests to the longevity of the transport of fine grain sediments from the Brisbane and other rivers into Moreton Bay.
Recently it has been proposed that humanly induced erosion of the coastal hinterland of Moreton Bay occurred during the Holocene as a result of Aboriginal firing of the landscape (Hall, 1990). This erosion was considered to have caused an increase in stream sediment loads which consequently led to an increase in the deposition, by the Brisbane River, of mud and muddy sand within the western part of the Bay. This corresponded with an argument by Hughes & Sullivan (1981), recently supported by Kohen (1996), that Aboriginal burning practices promoted soil erosion, concomitant increases in stream sediment loads; and increased siltation of rivers and coastal embayments throughout eastern Australia. In this scenario the above mentioned development of an exploitable littoral resource zone within Moreton Bay is considered to have been an indirect result of human habitation of the coastal hinterland within the Mid-Holocene (Hall, 1990). The merits or otherwise of an argument for the anthropogenic promotion of erosional conditions within the Brisbane River catchment in prehistoric times will not be discussed here. Suffice it to say that at present the evidence is based on limited palaeoenvironmental data and hence is not conclusive (Cotter in prep; Ulm, 1995). However It is pertinent to consider that human influence upon and interaction with the catchment of the Brisbane River has a longevity which extends well beyond the historical period. Nevertheless, as will be outlined below, the historical period is unsurpassed in its modifying effects upon the sediment facies of the Brisbane River and Moreton Bay.

**The Historic Period**

Stock & Neller (1990) maintain that the Brisbane River catchment is in a state of geomorphic transition with European development techniques and settlement patterns having profoundly disturbed the catchment. These authors present a number of anecdotal accounts of the change in the colour of the Brisbane River since the 1930’s which in general trend toward the view that the clarity of the water in the river has deteriorated from a clear blue/green during the pre-war period to a murky brown at present (Stock & Neller, 1990). This anecdotal evidence however must be considered in light of the observations made by the first Europeans to consider a river in Moreton Bay. On Wednesday the 16th of May 1770 Lieutenant James Cook observed the following:

*From Cape Moreton the land trends away west, farther than can be seen, for there is a small space, where at this time no land is visible, and some on board having also observed that the sea looked paler than usual were of the opinion that the sea looked paler than usual were of the opinion that the bottom of Moreton Bay opened into a river...* (Captain James Cook, 1770; cited in Mackaness, 1956:6).

Of those on board the *Endeavour* Sir Joseph Banks was one of those who held the opinion that there was a river flowing into Moreton Bay since he noted in his journal that:
The sea here suddenly changed from its usual transparency to a dirty clay colour as if charged with freshes, from whence I was lead to conclude that the bottom of the bay might open into a large river (Sir Joseph Banks, 1770; cited in Mackaness 1956:7).

Moreover John Oxley (1825) in reporting on his first visit to Moreton Bay in December 1823 made the following observations regarding his first sightings of the Brisbane River:

*Early on the Second Day, in pursuing our examination, we had the satisfaction to find the tide sweeping us up a considerable Inlet, opening between the first Mangrove Island and the Mainland. The muddiness and taste of the water, together with the abundance of fresh water Mollusca, assured us we were entering a large River...*

These brief commentaries, suggest that the Brisbane River carried enough suspended sediment at times prior to European settlement to cause it to be a muddy stream. In addition the first explorers also noted the effect that drought had on water quality within the river. Alan Cunningham, accompanying John Oxley up the river in September 1824, made the following observations in this regard:

*The young flood tide at length became felt as we passed up several new Reaches, in alternately northerly and southerly trends. We were however much disappointed in not meeting with Fresh water at the same stage on this stream as had been used last December by Mr. Oxley, thus serving us a proof that the great Drought that had so materially affected the Colony, had also extended to these Regions where probably no rain had fallen for many months and that consequently the body of Fresh water in this River having become considerably diminished by a vast daily evaporation, the salt water (not meeting with a weight or force to repel its pressure) had flowed up many miles beyond the spot marked on the Chart of the River, made last December. (Alan Cunningham, September 17th, 1824; cited in Steele, 1972: 154)*

As a consequence it is not possible to attribute all detrimental effects on water quality to post colonial catchment modifications. However as Brian Williams writing for the *Courier Mail* iterates the state of the Brisbane River is a current and emotive issue:

*The Brisbane River’s mucky appearance, riverbank collapses blamed on fast ferries, noise from dredges and other river users such as megaphone-driven rowing squads have stirred residents* (Williams, 1997:16).

Furthermore Williams (1997:16) clearly indicates that the focus of this emotion is on the issue of dredging with the following views reflecting the diversity of opinion:

*“130 years of extractive industries is enough”* (Di Tarte, Australian Marine Conservation Society)
*“...an end to dredging was likely to cause a reduction in turbidity and increased light penetration...dredging stirs up silt ...”* (Greg Miller, Envirotect)
*“Dredging has become the icon for all that is wrong with the river but that is not the case”* (Mary Maher, environmental consultant).

---

7 Steele (1972:6) maintains that it was in fact unlikely that the Brisbane River would have affected the waters observed by Cook & Banks at Cape Moreton, the river mouth being some 6 leagues distant from them.
Dredging however is but one of a number of direct and indirect mechanisms used to significantly modify the sedimentary regime of the Brisbane River during the historical period. Several authors (e.g. Department of Harbours and Marine, 1986; Dobson, 1990; Gregory, 1996; McLeod, 1978, 1990; Wallace, 1987) have provided comprehensive accounts of both the natural and anthropogenic modifications made to the Brisbane River subsequent to its initial survey by John Oxley in December 1823. It is not intended to reiterate this information here. Moreover HWQ 1.1 [this volume] (see Eyre et al, 1997) provides a timeline of the sequence of historical events which has lead to the present form of the river. For the purposes of this report, the main post colonial modifications which have impacted upon the distribution of sediment types within the river system can be summarised as follows:

- **Channel cuttings:** the first direct modifications of the Brisbane river channel began in 1861 and occurred at the river entrance where channels were excavated through what John Dunmore Lang (1861:60) described as being “neither sand nor mud but a species of marl that forms a sort of concrete and will not accumulate again” to allow ships to cross into sheltered waters (Figure 4.2a). The most recent modification to the entrance to the Brisbane River accompanied the development of the New Port of Brisbane facilities at Fisherman Islands in 1987 (Figure 4.2b) (Dobson, 1990)

- **Dredging:** the river has been comprehensively dredged; initially to both deepen and widen the channel for river transport and later to extract sand and gravel resources for infrastructure development in the city of Brisbane (Department of Harbours & Marine, 1986; Dobson, 1990; Gregory, 1996)

- **Training walls:** beginning in 1898 a series of training and revetment walls were constructed on both sides of the river (Figure 4.3a cf. Figure 4.3b) for the purposes of regulating river currents, promoting bed scour and reducing sedimentation within the navigation channels (Dobson, 1990; Department of Harbours & Marine, 1986).

- **Straightening of river bends:** between 1901 and 1920 four river bends, notably Garden’s Point, Kangaroo Point, Kinellan Point and Bulimba Point, were removed in order to improve river flow and reduce the shipping risks of navigating around tight river bends (Department of Harbours & Marine, 1986).

- **Bedrock removal:** the removal of bedrock from the channel in order to increase the navigability of the river channel occurred at Lytton & Seventeen Mile Rocks; blasting techniques were employed (Department of Harbours & Marine, 1986).
Figure 4.2. Initial and current measures to assist navigation across the Brisbane Bar: (a) Improvements to the Brisbane River entrance from 1867 to 1912.; (b) The present Brisbane River entrance depicting the 1987 bar cutting instigated to assist in the provision of a new port facility at Fishermans Island (after Dodson, 1990).
Dam and weir construction: Dams and weirs have been constructed both on the main Brisbane River channel (e.g. Mt Crosby Weir, 1926; Somerset Dam, 1935-43; Wivenhoe, 1977-1985) and on its tributaries (e.g. Enoggera Dam, 1866; Cabbage Tree Creek, 1916) both for the purposes of drinking water storage and for flood mitigation purposes (Gregory, 1996; Mcleod, 1978, 1990).

Catchment sediment influx increases: Beginning with the clearing of riparian vegetation for timber harvesting and the pursuit of agricultural endeavours in the 1840’s river bank erosion has led to the deposition of fine grained sediments within the present river channel. More recently, urban drainage channels and storm water run off have contributed fine sediments and pollutants to the stream bed (Boughton & Neller, 1981).

**Effects of Anthropogenic Modifications to the Brisbane River Estuary**

The known and probable effects of the above noted modifications to the distribution of sediment types within the Brisbane River and Moreton Bay are briefly discussed below:

The Brisbane River estuary has been subject to major structural change for more than 130 years when in 1866 the first significant dredging to improve the navigability of the channel began. (Wallace, 1987). A Department of Harbours & Marine map dated 1860 (see: Figure 4.2) documents the river prior to the onset of this change and shows that the river was a typical tidal estuary to the Hamilton Reach with features such as islands, sandbanks and multiple channels over an average width in excess of 1 km, bordered by extensive tidal marsh. (Wallace, 1987) The depth at the bar was 1.2 m with many of the areas up to Hamilton only a little deeper. In contrast by 1987 the river channel was 11.6 m deep and 180 m wide at the mouth and 9.1 m deep and 120 m wide up to Hamilton (Wallace, 1987). Indeed Wallace (1987) maintains that since 1866 some 100 million cubic metres of material has been dredged from the river.

Erskine (1990) notes that dredging to improve water depths, as has obviously occurred along the Brisbane River, whilst assisting navigation impacts negatively on stream channels since it may contribute to (a) upstream and downstream progressing bed erosion and (b) bank erosion due to undermining of the bank toe, increasing bank height and increasing bank angle. Significantly, with regard to (a) Erskine (1990) indicates that the extraction of about 40 million tonnes of sand and gravel between 1900 and 1980 from the Brisbane river estuary has resulted in 3 to 5 m of stream bed degradation; degradation being the extensive and progressive lowering of the river bed over time due to the sediment transport rate exceeding the rate of sediment supply. As has been established the streambed of the Brisbane River is armoured by coarse gravels which are typically only replenished during periods of high flow when stream velocities are sufficient to mobilise them. Beginning with the establishment of the Mt Crosby Weir in 1926, floods have been increasingly mitigated for along the Brisbane River and hence conditions for the mobilisation of gravels has been reduced. In addition the
source of these gravels remains upstream of the Flood mitigation works and consequently the likelihood of gravel replenishment is minimal even during extreme flows (Holmes, 1980). Likewise with regard to (b) consultants employed to investigate the cause of bank failure along the Brisbane
River after the 1974 floods attributed it to dredging (Wallace, 1987). Gregory (1996) indicates that operators of the dredge vessels were themselves aware of this effect on the stream channel:

*Tim Robinson who worked on the River, recalled: “It is my opinion that Coronation Drive fell in because of the dredging. From what I’ve seen when we used to dredge up the river, if we dredged a bit close to the bank we would gradually see the fence start to lean a bit and you’d move and go to another spot”* (Gregory 1996:162).

Erskine (1990) also notes that extraction induced changes in channel morphology produce changes in tidal hydraulics, such as increased tidal prism, tidal discharge, tidal range and tidal velocity. These in turn have feedback effects on salt intrusion and channel morphology. The construction of channels through the bar at the mouth of the Brisbane River, and subsequent lowering of reaches near the mouth have, in the terms of Stock & Neller (1990:50), made the estuary into a ‘larger arm of the sea’ and led to greater penetration of salt water and larger tidal exchanges. Stock & Neller (1990) provide commentary on dredging activities, particularly with regard to their probable contribution to reduced water quality within the Brisbane River and maintain that since the level and spatial extent of turbid water is influenced by saline water and hydrodynamic conditions (Milford, 1978) dredging has set and continues to reset the base conditions (Stock & Neller, 1990).

In addition Stock & Neller (1990) note that changes in the relative proportions of gravel, sand and mud in the estuary as affected by dredging activities has essentially changed the potential for beaches. As an exemplar of this point Gregory (1996) captions an historical photograph of the Brisbane River with the words:

*The sandy beach at Chelmer became a favoured recreational spot until the sand began to recede after the 1931 flood and was replaced by mud.* (Gregory, 1996:115).

However the disproportionate amount of mud (fine grain sediment) in the estuary is not simply a result of the removal of the coarser grade of sediment by dredging. At least three other contributing factors can be ascertained. Firstly, as noted earlier, increases in fine sediment are also a function of the reduced ability of the stream to replenish gravel due to such mitigation works as the Mt Crosby Weir which was established in 1926 (Holmes, 1980). In addition, the Bremer River a major tributary of the Brisbane has a catchment which is not a provenance of gravel grade materials (Sargent, 1978); and which beginning in the 1840’s was subject to significant land clearing for agricultural exploitation (both hard-hoofed grazing and cropping) which led to the erosion of fine-grained topsoil and its transportation into the river system (Stock & Neller, 1990). Significantly, the Bremer River was and remains an unmitigated stream and hence it continues to contribute fine-grained sediments to the Brisbane River, particularly during flood flows such as occurred during the 1974 floods (Holmes, 1980). Finally, the increased urbanisation of the Brisbane River catchment has enhanced stormwater runoff and contributed fine particulate to the River system (Boughton & Neller, 1981). In this regard the construction of Training and revetment walls along the river and the deposition of dredge spoils
behind them to effect reclamation of swampland for industrial landuse must be seen to have changed aspects of the hydrological regime of the catchment and consequently to have lead to increased runoff and deposition of fine-grained sediment into the river system.

Stock & Neller (1990) observe that for the Brisbane river there are:

> few extant records by technically qualified observers on which to base a firm description of the original river network especially the conditions of the channels and water quality.

Nevertheless it is clear from this report that today within the Brisbane River a disproportionate amount of mud in a significantly deepened and widened river channel; allied with increased salt water intrusion, reduced gravel armour and a daily disturbance of bottom sediments by dredging activities has a deleterious effect on water quality. Rather than dredging activities being the sole cause of this reduction in water quality it must be recognised that the current situation is the cumulative result of the evolution of a natural tidal estuary into the highly regulated and exploited drain of an increasingly urbanised catchment during the historical period.

**CONCLUSIONS**

Sub-surface investigations of sediments within Moreton Bay identify repeated depositional sequences with remarkably similar sediment characteristics that have been deposited throughout the Quaternary in response to climate fluctuations and sea level changes. Similarly the palaeochannel of the Brisbane River appears to have broadly occupied the same channel bed throughout several cycles of sea level fluctuation. Hence the gravel-clast bed morphology, comprising pool and riffle sequences, that currently characterises this River is a legacy of the transport, movement and redistribution of coarse sediments throughout the Quaternary; and the effect of sea level fluctuation upon the final deposition of these sediments. Similarly the mud and muddy sand facies which define the present delta of the River have a depositional history which has been in place since the cessation of the Mid Holocene Marine Transgression c. 6500 years ago.

Overprinted upon this rhythmical sedimentary depositional regime are anthropogenic impacts and influences to sedimentation with a longevity that may extend over the past 20 000 years. Whilst little information is available regarding the impact of Aboriginal burning and subsistence patterns in the region due to the absence of fine resolution multi-objective research into such problems, the post colonial impacts are better chronicled. For this time period, such impacts include: (a) the regulation of the river and tributary flows for water storage and flood mitigation purposes which has eliminated natural bed load transport of coarse sediments and hence depleted gravel-clast replenishment in the lower Brisbane River; (b) the impact of dredging for navigational and construction purposes which has removed the armour coating of the channel bed, significantly increased the re-suspension of fine sediments and initialised feedback responses to flow and sediment dynamics; (c) the clearing of
riparian vegetation which has lead to bank collapse and instability; (d) the clearing of the catchment for agricultural practises (particular hard hoofed grazing) which has initialised erosion of the topsoil; and finally (e) the spread of urban development which has increased the sediment yields of the tributary creeks via associated earthworks, vegetation loss and increased run off. In concert these impacts have had a deleterious effect on water quality within the Brisbane River estuary and although dredging of the river has been long considered to be the main cause of reduced water quality this is so only in the context of the relationship of this human activity to all others which modify the sedimentary regime of the river.
CHAPTER 5

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND III

LONG TERM VEGETATION CHANGE IN THE COASTAL WALLUM OF NORTH EAST NEW SOUTH WALES AND SOUTHEAST QUEENSLAND.

Boyd, W.E., McGrath, R.J. Cotter, M.M. and Peters, R. 
School of Resource Science and Management, Southern Cross University, Lismore, NSW.

Paper in Conference Abstracts and Proceedings Volume


Concept and design of research

Concept and Project Design: Boyd 25%; McGrath 25% Cotter, 25; Peters 25%

Collection, analysis and interpretation of data

Collection of data: Boyd 25%; McGrath 25% Cotter, 25%; Peters 25%

Analysis and interpretation of data: Boyd 25%; McGrath 25% Cotter, 25%; Peters 25%

Writing

Writing: Boyd 25%; McGrath 25% Cotter, 25; Peters 25%

Proof reading and edits: Boyd 25%; McGrath 25% Cotter, 25%; Peters 25%
CHAPTER 5

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND III

LONG TERM VEGETATION CHANGE IN THE COASTAL WALLUM OF NORTH EAST NEW SOUTH WALES AND SOUTHEAST QUEENSLAND.

ABSTRACT
A knowledge of long-term changes in vegetation is important for understanding the development and sustainability of modern vegetation patterns. Temporal vegetation changes may be due to variations in climate, sea level or human activity; or to a combination of these factors. This paper summarises the results of recent pollen analyses conducted on sediments obtained from five sites in coastal wallum communities within northeast New South Wales and Southeast Queensland (Eighteen Mile Swamp; Ningi Swamp, Bungawalbin Creek, Bundjalung National Park, and Emu Swamp). The sedimentary record at these sites span the last 2500, 6,000, 6500, 9,000 and 20,000 years respectively, and indicate local and regional change in floral regimes. In particular dynamic changes in forest, swamp and mangrove communities are apparent over times which have important implications for current and future conservation and management practices within this coastal zone.

INTRODUCTION: THE STUDY OF VEGETATION HISTORY AND ITS IMPLICATIONS FOR ENVIRONMENTAL MANAGEMENT
Pollen analysis is the study of fossil pollen grains and fern spores. In general pollen and spores become fossils when, subsequent to their dispersal from living plants, they are incorporated and preserved in sediments accumulating in lakes and swamps. These accumulated sediments and associated fossils, when undisturbed, usually reflect a depositional history marked by layered sequences from oldest at the bottom to youngest at the top. Furthermore the fossil pollen assemblage derived from the sediments usually reflects the mix of plants in the vegetation of the surrounding area, Indeed because of the distinctive shape and texture of pollen and spores it is frequently possible to determine the plant families, genera and in some cases, species, present in the past around a site. Different plants, however, produce different quantities of pollen and spores, and disperse them in different ways. By studying modern pollen dispersal processes, it is possible to recognise how the pollen and spores of different plants represent these plants in the fossil record; there is not merely a one-to-one relationship between numbers of pollen grains or spores and the number of plants.
represented and some plants indeed do not produce any pollen that is found as fossils. Nevertheless, interpretation of pollen diagrams - the graphs showing the proportions of pollen grains and spores recorded in sediment samples - can tell us a great deal about the past vegetation of a place.

Pollen analytical research has been conducted throughout the world, and almost every study shows that the vegetation has changed through time. There are many reasons why this has been so, and by studying lake and swamp sediments and their incorporated fossil pollen carefully, it is possible to identify what has been responsible for these vegetational changes. In general, the major causes of vegetation change are climatic fluctuations, movements in sea-level and shoreline position; and human activities. These causal agents either individually or in concert act to effect change in floral regimes.

The world’s climate has been fluctuating from cold and dry to warm and wet conditions for millions of years, even today, at a yearly to decadal scale, such change is occurring naturally. Sea level has also fluctuated considerably over cycles of decades to thousands of years. Significantly sea level has usually been much lower than at present (to 160 m below present sea level), rising to around or slightly higher than the present level only for short geological periods. Finally, wherever people have settled, they have adapted the environment deliberately or inadvertently in the course of their activities.

The variation through time of proportions of pollen and spores identified in pollen analytical studies represent changes in the presence and abundance of specific plants in an area in the past. These changes are related to the major causes listed above. When the climate changes, different plants move in and out of a region, adapting to the increasingly cool or warm temperatures and/or the increasingly dry or wet conditions. When sea level rises the coastline usually moves inland, and areas formerly distant from the sea come under the influence of the ocean; plants adjust either by becoming more or less abundant or by be replaced by other more suitable species. Finally, where human impact is occurring, either individual species become more or less abundant, new species become introduced to the vegetation, or the entire vegetational composition changes.

Such research has been conducted in the coastal wallum areas of northeast New South Wales and southeast Queensland, and case examples from this research are briefly described here. These serve to indicate both the types of change that have occurred in the past in this coastal zone; and the fact that vegetational change is an inherent but often locationally-specific part of the natural system in such dynamic coastal environments. Although the specific management implications of these studies will not be discussed here, it should be noted that the recognition of local environmental histories is most relevant in the field of environmental management. Within this field there has been a tendency, in instances where long-term (i.e. centennial to millennial rather than annual to decadal) environmental change is considered, to adopt and apply regional models of environmental change as derived from long vegetational histories ascribed to disparate sites such as Lake George in the southern N.S.W.
tablelands and Lynches Crater in northern Queensland. Such histories often do not provide useful base-level data for many more local situations, but nevertheless are applied at a trans-continental scale. The case of Bundjalung National Park is one such example. Although the temporal resolution of the pollen records obtained from the Bundjalung National Park and nearby Bungawalbin Creek is quiet coarse, the histories derived from these sites do provide insight into the rates and scales of changes in vegetation and fire regime over a long period of time and, importantly, are specific to this area; the fire regime history from Lake George, while important, is irrelevant to the north coast of N.S.W.

Most management plans are designed to last for five to ten years; the information outlined in the pollen records described below, however, provides a much longer-term perspective, and indicates that major environmental change has operated in this region at centennial and millennial scales. Moreover these case studies indicate that the vegetation of the area has not remained static for any great length of time, and rather than being characterised by stasis, can be better characterised as having been in a state of continuing flux. This flux represents environmental processes and change occurring over long time periods, and thus provides an important backdrop against which to assess short-term (annual to decadal) management plans if these latter plans are to conserve present natural conditions and processes effectively. By demonstrating that change is part of the natural environmental history of the region, future changes need not necessarily be viewed, as they tend to be at present, as being unacceptable and consequently to be avoided at all costs. Furthermore, attempts to preserve what exists now may indeed prove futile in the long run. An issue, for example, is that the current Fire Management Plan for Bundjalung National Park sets out guidelines which are based on an understanding of recent fire regimes. This Management Plan recommends that most vegetation communities (excepting rainforests) should be burnt if there have been no fires for the last 30 year period. The study reported here, however, suggests though that there has been much longer periods (possibly as long as or longer than a thousand years) in the not too distant past when the occurrence and perhaps recurrence of fire has been very low within the Bundjalung National Park. The recognition of such a history changes the perspective of current recommendations with respect to the sustainability of current vegetation communities and offers a challenge to environmental managers.

THE SITES, THEIR POLLEN RECORD AND SUMMARY ENVIRONMENTAL HISTORIES

Eighteen Mile Swamp

Eighteen Mile Swamp is a back barrier coastal swamp on the seaward side of North Stradbroke Island, southeast Queensland (Boyd, 1993). It is some 25 Mk long and 1 Mk wide, and is protected from the Pacific Ocean by Holocene coastal dunes. North Stradbroke Island is one of several coastal sand islands protecting the seaward edge of Moreton Bay, a subtropical marine bay fringed to the east by relatively uninhabited islands and to the west by the city of Brisbane. The fossil pollen evidence described from this site indicates that the major influences on vegetation history here are coastal
morphological changes associated with sedimentation and the growth of coastal sand barriers, and local hydrological changes.

The pollen analytical study of the swamp indicates that most of this large swamp probably formed only around 600 years ago following the closure of a coastal sand spit. Earlier, since at least 2,400 years ago, the area was a typical low energy tidal bay. During these 2,400 years, changes in dominant vegetation types in the area largely reflect former watertable fluctuations. The pollen diagram is divided into three stratigraphic periods. During the earliest period (Zone 1), the pollen evidence reflects the presence of a swamp whose vegetation at this site is open and probably dominated by *Restio*, but also with sedges and grasses contributing to the local flora. Woodland at the edges of the swamp and possibly on the dunes, at least immediately surround the site, is dominated by *Casuarina*. Fringing woodland may have contained palms; palms are currently present at the edges of the swamp elsewhere, and characterise marginal vegetation between mangrove and freshwater conditions at the southern end of the swamp. The palm pollen may also have been derived from closed forest in the area, a forest probably containing figs, the likely source of the Urticaceae/Moraceae pollen. Of particular note is the slight presence of *Avicennia*, which indicates the relatively-nearby presence of mangrove conditions. The pollen of mangrove trees is, in general, not widely dispersed from the source plants, so it is safe to presume that, even with the small quantities evident here, mangrove communities were within relatively close proximity to the site. Given that this pollen zone reflects the onset of organic accumulation and, by inference, freshwater swamp conditions at this site, it is probable that this is the period most likely to be associated with marine margin conditions near this site.

Zone 2 provides evidence for a substantial floristic and structural change in the vegetation of the swamp at this site. The critical change is in the establishment of *Melaleuca* (cf. Myrtaceae 1 pollen type) woodland at this site, with an associated suppression of the swamp herb communities, especially those dominated by *Restio*, at this site. Areas of sedges and grasses, assuming that the latter have a swamp origin, appear less affected by the insurgence of *Melaleuca*, and thus there may be evidence here for the spatial differentiation of swamp types and their evolution. The reduction in *Casuarina* values during this expansion of *Melaleuca* probably represents a reduced *Casuarina* pollen influx to the site, rather than any reduced presence of *Casuarina* in the area, as the increased bulk of the trees and shrubs now growing on the swamp produced a filtering effect of pollen derived from beyond the immediate environs of the site. There does appear, however, to be some changes in the dryland vegetation around the site. Of particular note are the expansions of Epaclidaceae and, to a lesser extent, *Banksia* and other Proteaceae, presumably reflecting the establishment of heath vegetation nearby.
Zone 3 appears to reflect slightly changing conditions, probably both on the swamp at this site and in the neighbouring areas. By this time, the mangrove influence is absent, and there appears to be a partial reversal of the Restio-Melaleuca situation, with some decline in the Myrtaceae 1 values corresponding to a slight rise in both Restiad and Casuarina values. This suggests a period of Melaleuca decline and swamp opening at the site. Although the Epacridaceae values, now at a maximum, are maintained, an increase in values of Leguminoseae pollen (representing the Papilionaceae legumes) and a decline in the Urticaceae/Moraceae pollen values suggest that there were changes in the floral composition of the drier area vegetation. Of note at the close of this phase are the indications of European influence upon the vegetation, in particular the presence of Compositae (Tubuliflorae) pollen which probably represents Taraxacum or related introduced weeds.

The changes described here, therefore, largely reflect the nature of the swamp and its vegetation. In particular, the fluctuations between Restio dominance and Melaleuca dominance suggest that there have been fluctuations in the water balance of the swamp. For Melaleuca to become established there needs to be a slight reduction in the level of the water table. Given that at the time of presumed expansion of Melaleuca only a shallow development of organic peat overlay sand, potentially well-draining sediment, such fluctuation in water table need only have been minimal. The later phase of apparent reduction in Melaleuca may have been induced by an increase in the permanency of waterlogging, a condition which probably inhibits seedling development of Melaleuca.

Ningi Swamp, northern Deception Bay

Ningi Swamp is an approximately 1.75 km² seasonally inundated acidic swamp which lies 2 km landward of the present shoreline of northern Deception Bay southeast Queensland (27° 04' 50" S 153° 04' 39" E). The vegetation of the swamp is characterised by an upper stratum dominated by Melaleuca quinquenervia and a lower stratum dominated in the better drained areas by the swamp fern Blechnum indicum and the sedge Baumea rubignosa, and by Phragmites australis in the more waterlogged areas. The sediment core site (TP1) is 2.55 m above sea level and is situated at the southeast margin of the swamp within the western boundary of an operational sand extraction facility. The native vegetation at the core site was disturbed in the early 1970’s in preparation for planting of Pinus elliotti which proved unsuccessful, probably due to waterlogging, although some isolated pines persist. Currently the vegetation around the site is dominated by the native grass Imperata cylindrica in association with Blechnum indicum and juvenile Melaleuca quinquenervia.

The Pollen record at this site, when coupled with geochemical evidence for acid sulphate soil conditions, radiocarbon and thermoluminescence dating of selected sediment facies; and granulometric studies of dunal features (Cotter, 1996) provides evidence for dynamic environmental change throughout the last + 6,000 years within northern Deception Bay. In particular sea level and or tidal regime fluctuations and onshore sediment transport mechanisms are considered to have promoted the
sequential formation, siltation and reformation of tidal lagoon conditions along the Deception Bay shoreline throughout the mid to late Holocene. In essence the evidence highlights the fact that particular geomorphic processes have been operational on an intermittent but repeated basis in this environment throughout the mid to late Holocene. Moreover the evidence indicates that past analogues for present coastal features such as tidal lagoons are to be found in nearshore sedimentary sequences. Consequently the study of these sedimentary sequences offers those working in the field of environmental management a unique opportunity to enhance their understanding of modern coastal environments.

The pollen record obtained from Ningi swamp has been divided into five Phases (Figure 5.1).\(^5\) Phase I at \(6,000\) years BP is characterised by a very low frequency of pollen types which though rare is dominated by mangrove pollen of the Rhizophoraceae family. It is considered that at this time sea level was about stable with present levels and the site was a semi-submerged part of the flat coastal plain typified by mangrove mudflats. Phase II at \(5,800\) to \(4,600\) years BP is characterised by a decline to absence of mangrove pollen types and a concomitant increase in dune colonising vegetation (i.e. Casuarina, Monotoca, Banksia and grass species), and freshwater swamp types (i.e. Restiads, sedges and Myriophyllum). At this time sea level is considered to have been stable to slowly rising above present levels with marine sediments, entrapped within northward onshore currents circulating along Deception Bay, instigating the formation of sand spits seaward of the present shoreline. As sedimentation increased these spits became sand barriers and ultimately formed a new shoreline which was then stabilised by dune colonising vegetation. On the lee slope of this ‘barrier dune’ rainfall runoff from nearby sandstone ridges accumulated in ephemeral freshwater pools.

During Phase III \(4,600\) to \(2,300\) years BP there was a return to the dominance of mangrove pollen types particularly Aegiceras sp. with Avicennia sp. and Rhizophoraceae also present. The evidence suggests that at this time sea level, or at least the tidal regime was higher than at any time prior during the Holocene and the previously formed ‘barrier dune’ was significantly breached in its northern section adjacent to a probable palaeochannel. Furthermore, the newly inundated area behind this coastal dune barrier, with egress to the tide, became a coastal lagoon dominated by mangrove species. Significantly as this Phase progressed constant sedimentation along the shoreline of the bay began to cause siltation at the tidal inlet of the lagoon and consequently its areal extent began to decline. In the latter stages a rapid sea-level decline at \(3,000\) years BP completely isolated the former tidal lagoon and mangrove taxa began to be eliminated from the area. Phase IV \(2,300\) years to \(1,400\) years BP is considered to be a transitional phase at the core site as mangroves decline to become absent and an influx of grass and sedge species occurs heralding the onset of freshwater

\(^5\) No figures were included in the text of this paper within the final Conference Proceedings volume in which it was published. However pollen diagrams of the analyses reported for each site were prepared by myself using the TILIA Program (Grimm, 1987) and displayed at the Conference venue. For brevity I have included the pollen diagram relating to my research in northern Deception bay at the end of this chapter. For brevity I have not included the pollen diagrams of the other case studies reported. If the reader is interested further details of these other case studies can be obtained with reference to the following (Boyd, 1993; McGrath, 1995; McGrath & Boyd, 1998; Peters, 1990).
swamp conditions. During Phase V c. 1400 years BP to the present, *Melaleuca cf. quinquenervia* pollen increases to predominate the pollen assemblage, the occurrence of *Blechnum indicum* also increases at this time reflecting the expansion of the current *Melaleuca* swamp forest and its establishment immediate to the core site. *Pinus elliotti* is also recorded but only from the uppermost sample confirming its status as a recently introduced exotic species.

**Bundjalung National Park**

The site, c. 8 km south of Evans Head and 3 km from the coast (29° 11’ 25” S, 153° 22’ 33” E, c. 10 m above sea level), is located in the upper reaches of a large swamp lying between Pleistocene dunes, aligned approximately parallel to the coast, within the Bundjalung National Park (McGrath, 1995; McGrath & Boyd, submitted). The swamp is spring-fed at its eastern margins and is dominated by sedge and grass species. The high dune to the east consists of fine-grained and well-sorted white sand, and its lower margins are fringed with *Banksia aemula*. Upslope *Eucalyptus* woodland and open forest with a shrubby *Acacia* understorey predominates. The dune to the west is less pronounced and consists of coarse, poorly-sorted sand. Here the edge of the swamp is bordered by a thick fringe of *Melaleuca quinquenervia*, with a belt of remnant rainforest upslope which is replaced further upslope by *Eucalyptus* woodland - open forest.

The pollen record spans the period approximately 8,700 years before present (BP) to the present. The period from c. 8,700 to c. 7,500 BP probably marked the end of a relatively dry period in which there was a very active fire regime. The vegetation near the site had been dry heath but changed to *Casuarina* as the conditions got wetter and freshwater swamp conditions developed. The period c. 7,500 to c. 6,400 BP was a wetter period with the swamp vegetation dominated first by sedge species and later by Restiads as sediment accumulation reduced the depth of the swamp. *Melaleuca* also increased at this time around the fringe of the swamp reducing the dominance of *Casuarina* in the latter stages. The occurrence of Podocarps suggests that this period was not only wetter but also cooler. These cooler wetter conditions may also have been responsible for a noted lack of fires. Large coastal storms may also have occurred at this time, accounting for the presence of mangrove pollens so far above sea level; although mangrove pollen is usually only poorly dispersed from its source plants. The period c. 6,400 to c. 3,200 BP was a much drier period although swamp vegetation, principally Restiads, still persisted. The surrounding vegetation included sclerophyll forest. There was also an increase in the occurrence of fires in this dry period. The period c. 3,200 to c. 700 BP was similar to the previous period, although there appears to have been slightly wetter conditions with Restiads dominating the pollen assemblage at this time and Podocarps having a rare occurrence. Fire also declined at this time. The period c. 700 BP to present was another period of drier conditions with Myrtaceae species predominate and small quantities of *Casuarina* noted. For the first time during this record, the herbaceous vegetation is dominated by grasses, which may be a combined result of sedimentation and drying, or it may have been a consequence of European activity. The depth of the
single sample which makes up this zone corresponds to c. 84 years ago, calculated on an assumed constant rate of sedimentation. Fire occurrence increased once again during this period.

Bungawalbin Creek
The site, situated c. 20 km west of Evans Head (29° 06' 30" S, 153° 13' 20" E, c. 1 m above sea level), is located in a c. 1 km² back swamp of the Bungawalbin Creek (McGrath, 1995; McGrath & Boyd, submitted). Half the swamp is on Crown Land and the remainder is privately owned. The vegetation was in a relatively natural state until recently, when the privately-owned portion was cleared for commercial tea tree (Melaleuca alternifolia) planting. The swamp is surrounded by tall open forest with the upper stratum dominated by flooded gum (Eucalyptus grandis) and swamp turpentine (Tristania suaveolens) while the lower stratum consists mainly of Melaleuca quinquenervia and M. alternifolia. At the edge of the swamp there is a thick fringe of M. alternifolia. The swamp itself was recently burnt and is currently covered by a thick regrowth of Lepironia articulata.

The pollen record spans the period from approximately 6,600 years BP to the present. Geochemical evidence of acid sulphate soil conditions suggests that the area around the Bungawalbin Creek site was a quiet saltwater embayment from before c. 6,600 to around c. 2,800 years ago. This low energy environment was suitable for the accumulation of a very fine silty sediment which combined with a possible slight decline in sea level eventually raised the site above the tidal limit resulting in the formation of the present freshwater back swamp. The general trend over the period in which the site was subject to tidal influences (c. 6,600 to c. 2,800 BP, Zones BW1 to BW3) appears to be that of a gradual drying out of the nearby terrestrial environment, with a continual increase in Myrtaceae pollen. The only break in this trend appears to be around c. 5,900 to c. 5,600 BP (Zone BW2) when Casuarina was dominant. This fluctuation probably represents a prograding shoreline with a fringe of Casuarina. From c. 2,800 BP to the present, grasses and sedge species dominate the total pollen assemblage with Myrtaceae species remaining the main tree taxa. The dominance of the herb taxa at this time most likely resulted from the transition, on site, to open terrestrial conditions similar to those now present. The increase in the occurrence of fire also indicates a continual drying of the climate. Using the assumed sedimentation rates, the top sample corresponds to c. 230 years ago: if this is correct the pollen data do not reflect European activities.

Emu Swamp
The site of Emu Swamp lies just to the south of Lake Weyba National Park close to the town of Coolum, and around 1 km from the present shore, at 26° 29' 00" S 153° 05' 00" E. The site lies close to sea level at the base of the high Pleistocene dunes which flank the north-eastern corner of Emu Swamp separating the core site from Holocene coastal deposits and the shoreline to the east. It is located in a shallow swale adjacent to the dunes, and peat depth decreases southward from the site, becoming overlain with sand further out into the swamp. Surface water on site suggests that it forms part of the
diffuse drainage line which extends in an approximately south-easterly direction through the area. To the north, the swamp forms the margins of Lake Weyba.

The combination of the pollen and charcoal record with radiocarbon dating provides the basis for a reconstruction of the environmental history of Emu Swamp (described by Peters, 1990). In this case there is evidence for both local and regional vegetational changes. The local vegetational history represents the control of hydrological conditions over the swamp and its immediate environs, whereas the regional vegetation history probably reflects the impacts of changing climate and shoreline position. Approximately 19,000 years ago, as the cold, dry conditions of the Late Pleistocene began to ameliorate, organic matter, probably blown by the south-easterlies against the remnants of the older Pleistocene dunes, had accumulated enough to form a relatively impermeable layer in a depression at the base of the dunes. Increasing precipitation assisted by seepage from the adjacent dunes caused the formation of a shallow perched lake which was dominated by the aquatic herb *Myriophyllum* sp., and fringed by Restiads. Woodland occupying the surrounding sand plains was dominated by Myrtaceae species such as *Eucalyptus*, and by *Casuarina*, until towards the end of the glacial period when the *Casuarina* declined. *Casuarina* may have been disadvantaged by an increasing occurrence of fire, which in turn may reflect the arrival of Aboriginal people to the area. Throughout the Late Pleistocene conditions continued to become warmer, and increased precipitation caused the extension of freshwater conditions at the site. However, in the early to mid-Holocene, conditions changed abruptly, causing a marked reduction in the water table and the rapid disappearance of the aquatic herbs which were replaced by the opportunistic Restionaceae more suited to the drier, yet swampy conditions. These conditions also favoured sedges, and *Melaleuca* was able to colonise seasonally-waterlogged sites in the area. The absence of *Melaleuca* during the earlier time when freshwater conditions were well established suggests that much of the micro-relief of the area was permanently submerged. It seems unlikely that normal organic sedimentation and infill processes could have been responsible for the rapid change in water balance indicated by the *Myriophyllum* - Restiad reversal, as this would imply an exponential increase in the biomass of the surrounding area. It is difficult to ignore the connection between hydrological change at the site and sea level, although the relationship is not necessarily obvious. There is some evidence along the southern Queensland coast that sea level at this time was 1 - 1.5m higher than present and approximately 1 m higher 4,000 years BP. Certainly by several thousand years earlier the rising sea level would have resulted in the shoreline migrating from well-off-shore to close to its present position. With this change, as indicated above, local hydrological conditions changed, but also the regional vegetation became more influenced by coastal conditions. This change is represented in the pollen diagram for Emu Swamp by a significant change in the composition of the Myrtaceae pollen. Although Myrtaceae pollen cannot be assigned to species with confidence (due to the morphological homogeneity of the pollen), there is sufficient evidence to indicate that a change in the Myrtaceous composition of the region changed at around 7,000 years ago.
CONCLUSIONS

These case studies illustrate several important points regarding the history of the coastal wallum of northeast New South Wales and southeast Queensland. The first is that the natural vegetation has rarely remained static over time, and that in all the cases examined, over time scales of hundreds and thousands of years, the dominant composition and the structure of the vegetation at very locality has changed. Whereas some of the evidence summarised here reflects the effects of changing water table hydrology on, especially, the composition of coastal wetlands, the nature of the dryland vegetation in the vicinity of the study sites has also been shown to change. The latter changes in the studies here, in large part reflect climatic changes which whiles not necessarily being of great magnitude, were probably influential; enough to cause changes in dominance. Secondary changes also affected the vegetation, these primarily being the effects on water availability and on fire regime.

The second major environmental contributant to vegetational change in this region is sea-level change. Sea levels have been fluctuating at global scale throughout geological time. With the rise of sea level in post glacial times (the last 10,000 years or so), shorelines have moved landwards across what is now the off-shore continental shelf. With this shoreline migration, not only has the terrestrial hydrology been affected, but entire ecosystems have had to shift from being predominantly inland systems to being coastal systems. Some of the compositional changes illustrated here represent such important change. Finally, it should be noted that neither natural climate change nor natural sea-level change has ceased, and that while human activity may be having an effect on for example, global warming and sea-level rise, the effects –climatic, physical and biological– of these may not be distinguishable from the natural changes, and many of the changes witnessed in the modern environment may indeed be those expected under natural conditions of climatic and se-level change.
Figure 5.1. Summary Pollen diagram obtained from Sediment core TP1, Ningi Swamp northern Deception Bay, southeast Queensland.
CHAPTER 6

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND IV

THE HOLOCENE COASTAL EVOLUTION OF DECEPTION BAY, SOUTHEAST QUEENSLAND: IMPLICATIONS FOR PREHISTORIC CULTURAL HERITAGE MANAGEMENT WITHIN NORTHERN MORETON BAY.

Maria Cotter
Centre for Coastal Management, School of Resource Science and Management, Southern Cross University, Lismore NSW.

Published book chapter


Concept and design of research

Concept and project design Cotter, M.M.

Collection, analysis and interpretation of data

Collection of data: Cotter, M.M.

Analysis and interpretation of data: Cotter, M.M.

Writing

Writing, proof reading and edits: Cotter, M.M.
CHAPTER 6

THE ENVIRONMENTAL MANAGEMENT AND PLANNING CONTEXTS OF THE GEOARCHAEOLOGICAL MODELLING OF ENVIRONMENTAL CHANGE IN DECEPTION BAY, SOUTHEAST QUEENSLAND IV

THE HOLOCENE COASTAL EVOLUTION OF DECEPTION BAY, SOUTHEAST QUEENSLAND: IMPLICATIONS FOR PREHISTORIC CULTURAL HERITAGE MANAGEMENT WITHIN NORTHERN MORETON BAY.

INTRODUCTION
Deception Bay forms the most northern mainland element of the larger, more widely known Moreton Bay. It is a low energy tidal embayment with a shoreline characterised by a relatively flat coastal plain itself dominated by estuarine mudflats and prograded beachridges. The local prehistoric archaeological record of Deception Bay features a diverse range of site types including a ceremonial bora ground, a possible stone-fish trap, the well-documented Sandstone Point midden complex, a probable swamp fern processing site, and numerous undated shell middens (Cotter, 1996). The chronological evidence suggests that prehistoric occupation and resource exploitation of Deception Bay has occurred only within the last 2,000 years in contrast to regional evidence indicating occupation of the southeast Queensland coastal lowlands for the past 20,000 years (Hall, 1987).

In the context of an environmental archaeological study this paper reports summary details of palaeobotanical and geochemical evidence for the mid-to-late Holocene coastal evolution of Deception Bay. Radiocarbon and thermoluminescence age determinations of several sediment facies within the bay are also presented to provide a chronometric framework for this coastal evolution, a framework directly comparable to the archaeological record (Cotter, 1996). In light of this comparison discussion is directed towards an assessment of the likely impact of this Holocene coastal evolution on the formation, preservation and current visibility of the archaeological record of the Bay. Finally, an assessment is made of (a) the importance of understanding coastal geomorphic processes for the effective management of prehistoric cultural heritage within the coastal zone and (b) the specific implications of the Holocene evolution of Deception Bay on the management of the prehistoric cultural heritage of northern Moreton Bay.
**GEOMORPHIC PROCESSES**

The evidence suggests that coastal progradation, wind-blown sand transport, and the intermittent formation of tidal lagoons adjacent to the shoreline are features of the geomorphic history of the bay. In particular evidence for influxes and subsequent declines in mangrove pollen types (i.e. Rhizophoraceae, *Avicennia* & *Aegiceras*) through time, in sediments situated 1.75 km landward of the present coastline, provides clear evidence both for sea-level fluctuations in the region during the mid-Holocene as well as for subsequent progradational events. Geochemical evidence of acid-sulphate soil conditions concurs with this palaeobotanical evidence for a past marine transgressive event within the Bay. Importantly AMS dating of associated sediments indicates that the most significant positive change in sea-level/tidal regime occurred at c. 4,600 BP. Later, as sea-level began to drop to present levels, shoreline progradation was facilitated by a relatively stable supply of marine sediments so that a characteristic ridge and swale system has developed parallel to the present coastline. In addition particle size analyses indicate that aeolian sands have accumulated over the earliest prograding dunes obscuring much of the microtopography.

**IMPLICATIONS FOR THE ARCHAEOLOGICAL RECORD**

This geomorphic history provides some explanation of both the spatial and temporal patterns observed in the local archaeological record of Deception Bay and has several implications with regard to the formation, preservation and interpretation of that record. These can be summarised as follows:

- It is unlikely for evidence of early Holocene or late Pleistocene occupation of the coastal lowlands to be found in this region. Moreover if Pleistocene occupation occurred in the area all evidence would now be overlain by several metres of Holocene sands.
- The palaeobotanical evidence suggests that the tidal lagoon system presently featured along the Deception Bay shoreline is a modern consequence of an intermittent but repeated geomorphic process operational in the area throughout the mid to late Holocene. It is probable therefore that the resource zones presently observable within Deception Bay (including estuarine mudflats, tidal lagoons, and *Melaleuca* swamps) existed in some form throughout the last 5,000 years and hence were available throughout this period for prehistoric human exploitation despite the lack of archaeological sites of this antiquity.
- Artefactual material noted eroding out of dunes dated to c. 5000 years BP suggest that elements of the Mid-Holocene component of the regional archaeological record have been overlain with aeolian sands, rendering them invisible in the present landscape, and providing at least one environmental reason for the lack of observable sites of more than 2,500 years old in the area.
- The unconsolidated sediments of the estuarine mudflats and prograded dunes of the coastal plain do not provide the raw material resources for many of the lithic artefacts found within
Deception Bay. As a consequence artefacts found within these dunal systems must have been transported to the area, perhaps through trading networks. It is likely therefore that a lack of suitable geological outcrops for stone tool manufacture within northern Deception Bay impinged upon the nature and type of social interactions in which the prehistoric occupants of the area engaged.

**IMPLICATIONS FOR PREHISTORIC CULTURAL HERITAGE MANAGEMENT WITHIN MORETON BAY.**

It is clear that a full appreciation of the spatial and temporal patterns observed in the archaeological record of Deception Bay is concomitant on a detailed understanding of the nature, timing and extent of coastal geomorphic change within the bay. This finding has a number of implications for cultural heritage management initiatives and practice within the coastal zone, and specifically for northern Moreton Bay:

(a) Prehistoric cultural heritage management within the coastal zone requires the adoption of interdisciplinary studies for the effective determination of the significance and vulnerability of the local and regional archaeological record. Of paramount importance is the determination of the effect of coastal processes on the form, preservation and visibility of the known archaeological record.

(b) Within Deception Bay it is apparent that there exists a subsurface component to the prehistoric archaeological record. Therefore cultural heritage management strategies which are designed to ascertain and protect surface exposures of cultural material only, are likely to be inadequate.

(c) Northern Moreton Bay exists within one of the fastest growing regional areas of Australia (Tarte, 1993). To maximise the effectiveness of cultural heritage management in this rapid urban growth area, prior to new development subsurface assessments for cultural heritage material should be carried out to prevent any disputation that might arise if such material was to be found subsequent to development approval.
CHAPTER 7

REFINING AND QUESTIONING THE PALAEOGEOGRAPHIC MODEL I

RADIOCARBON AND THERMOLUMINESCENCE DATING OF QUATERINARY SEDIMENTS IN DECEPTION BAY, SOUTHEAST QUEENSLAND: SOME PROBLEMS ENCOUNTERED.

Maria Cotter
School of Resource Science and Management, Southern Cross University, Lismore, NSW.

Published abstract & poster presentation


Concept and design of research

Concept and Project Design: Cotter, M.M.

Collection, analysis and interpretation of data

Collection, analysis and interpretation of data: Cotter, M.M. [or as acknowledged in the text]

Writing

Writing: Cotter, M.M.

Proof reading and edits: Cotter, M.M.

Preparation of Tables and Graphics: Cotter, M.M. [or as acknowledged in the text]
CHAPTER 7

REFINING AND QUESTIONING THE PALAEOGEOGRAPHIC MODEL 1

RADIOCARBON AND THERMOLUMINESCENCE DATING OF QUATERNARY SEDIMENTS IN DECEPTION BAY, SOUTHEAST QUEENSLAND: SOME PROBLEMS ENCOUNTERED.

ABSTRACT
Radiocarbon and Thermoluminescence (TL) dating of sediment facies were utilised to develop a chronometric framework for the Quaternary coastal evolution of Deception Bay southeast Queensland (Cotter, 1996). This chronometric framework was developed in the context of a broader geoarchaeological and palaeogeographical investigation of the Indigenous cultural landscape of the area. The TL analysis confirmed the presence of previously undated Pleistocene sands within the study area. However in the course of dating one sedimentary sequence, conventional radiocarbon analysis of Notispisula shells produced an age of 5190+/− 90 years BP (beta -85415) whilst an overlying sandy unit (shown by particle size analysis and SEM surface textural analysis to be aeolian transported) subject to TL-dating produced an age of 14,900+/−3300 years BP (W1942).

This poster highlights the considerations made in order to reconcile this obvious anomaly. In effect, previously obtained radiometric data within the study area (Flood, 1981; Hall, 1996) in conjunction with an examination of the adequacy of the sampled materials for radiocarbon and TL age determinations point to the TL determination being in error. Similar anomalies have been shown to occur elsewhere in southeast Queensland (Tejan-Kella et al., 1990), explanations for which have been related to selective rather than total bleaching of Holocene sands (Prescott, pers. comm.). Re-dating of the sand sequence using the selective bleach method is required to examine whether the dating anomaly shown for Deception Bay parallels selective bleaching effects determined for other sequences within southeast Queensland. Unfortunately this is beyond the scope and funds of this geoarchaeological study.

INTRODUCTION
Within the context of a geoarchaeological and paleogeographical investigation of the indigenous cultural landscape of Northern Deception Bay southeast Queensland (Figure 7.1), radiocarbon (both conventional and AMS) and thermoluminescence dating techniques were utilised to examine selected sediment facies within this coastal plain. The chronology developed from the application of these dating methods was expected to provide the framework upon which understandings of the Quaternary (especially Holocene) evolution of Deception Bay could be founded. Furthermore such a chronometric
framework may enable the explication of the rates and mechanisms of environmental change within an environment and hence in the context of this study it was expected to enhance understandings of the diverse, but predominantly Late Holocene, indigenous archaeological heritage of the area. Problematically, stratigraphic anomalies relating to chronology were encountered when both radiocarbon and thermoluminescence dating methods were utilised to age different sedimentary units within the same stratigraphic sequence. This poster presentation highlights one such anomaly and considers the issues involved in reconciling the clear disparity in age determinations provided by the two dating techniques.

**THE ISSUE**
Conventional radiocarbon analysis undertaken on *Notispisula* shells obtained from a depth of 220-230 cm down the Wallace Road Beachmere dune profile produced an age of 5190±90 years BP (Beta 85415) whilst an overlying sandy unit, subject to TL-dating, produced an age of 14,900±3300 years BP (W1942) (Figures 7.2 & 7.3). Whereas examination of all available radiocarbon data obtained in both geomorphological and/or archaeological research contexts point towards a maximum Mid-Holocene age for this dune system (QhCB2) (Table 7.1). Observations (and anecdotal evidence) of artefactual material eroding out of this dune system (Figure 7.4) makes the determination of the age of the dune of critical importance to the understanding of the patterns of human occupation within the region during the prehistoric past.

**TL DATING LIMITATIONS**
SEM examination of sand grains obtained from the dune ridge system (*i.e.*QhCB2) noted at Wallace road Beachmere suggest the following limitations of the TL dating thus far undertaken within Deception Bay:

1. The aeolian transport of grains within a nearshore environment - as evidenced by surface textural characteristics featured upon sand grains obtained from Wallace Road - may result in rapid and/or short term mobilisation and formation of dunes. This effect has been noted to occur elsewhere in southeast Queensland (Tejan-Kella 1990; Prescott n.d.), and it has been posited as a reason for the return of unexpectedly old TL-dates using the ‘total bleach’ method. In effect transport of sand in this way results in insufficient exposure to sunlight so that ineffective and/or partial bleaching occurs resulting in an accumulation of inherent thermoluminescence within each sand grain.

2. The extensive surface solution pitting, noted in Figure 7.5 is indicative of dissolution effects. The percolation of water within dune systems is known to be problematic for TL-dating because it may cause the removal of the radionuclides (K, U & Th) that are known to provide the majority of the radiation flux to the samples. Removal of these radionuclides by water can therefore cause the determination of erroneously old TL ages (David Price *pers. comm.*).
3. Clay and/or iron oxide coatings upon the surface of sand grains, a phenomenon also noted to occur elsewhere within southeast Queensland (Sullivan & Koppi, 1998) may also prevent complete bleaching of the grains by sunlight (Figure 7.6).

Table 7.1: C14 Radiometric data obtained from various materials sampled within the coastal plain of northern Deception Bay.

<table>
<thead>
<tr>
<th>RESEARCH CONTEXT</th>
<th>SAMPLE MATERIAL</th>
<th>LAB. CODE</th>
<th>C14-Age a (Yrs BP)</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geomorphological (beach ridge deposits)</td>
<td>shell</td>
<td>SUA 1253</td>
<td>5135 ±1 70</td>
<td>Flood 1981</td>
</tr>
<tr>
<td></td>
<td>shell</td>
<td>SUA 1254</td>
<td>5715 ± 115</td>
<td></td>
</tr>
<tr>
<td></td>
<td>shell</td>
<td>SUA 1255</td>
<td>755 ± 115</td>
<td></td>
</tr>
<tr>
<td></td>
<td>shell</td>
<td>SUA 1256</td>
<td>650 ± 130</td>
<td></td>
</tr>
<tr>
<td></td>
<td>shell</td>
<td>SUA 1257</td>
<td>995 ± 70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>shell</td>
<td>SUA 1258</td>
<td>1910 ± 130</td>
<td></td>
</tr>
<tr>
<td></td>
<td>shell</td>
<td>OZB673U</td>
<td>950 ± 55</td>
<td>McClure 1995</td>
</tr>
<tr>
<td>Archaeological (Midden deposits)</td>
<td>charcoal</td>
<td>Beta-15808</td>
<td>103 ± 0.8%</td>
<td>Ulm 1995</td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-15806/A</td>
<td>320 ± 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-15806/B</td>
<td>340 ± 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>SUA-2358</td>
<td>500 ± 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>SUA-478</td>
<td>620 ± 95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>SUA-2357</td>
<td>740 ± 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-15809</td>
<td>740 ± 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>SUA-479</td>
<td>780 ± 95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-16837</td>
<td>810 ± 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-15805</td>
<td>1190 ± 100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-15807</td>
<td>1500 ± 110</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-16838</td>
<td>1600 ± 80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-15810/A</td>
<td>1990 ± 60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>charcoal</td>
<td>Beta-15810/B</td>
<td>2290 ± 100</td>
<td></td>
</tr>
<tr>
<td>Geoarchaeological (relict and modern lagoonal deposits)</td>
<td>shell</td>
<td>Beta 83926</td>
<td>2370 ± 100</td>
<td>Cotter 1996</td>
</tr>
<tr>
<td></td>
<td>Humic sands</td>
<td>OZA-388</td>
<td>5800 ± 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humic sands</td>
<td>OZA-387</td>
<td>4600 ± 50</td>
<td></td>
</tr>
</tbody>
</table>

*Conventional C14 Age determinations

CONCLUSION

For Deception Bay TL-dating has, at the broad scale, aided the identification of a Late Pleistocene dune sequence not previously recognised see Figure 7.2. However, the “total bleach” method utilised in this study appears problematic when dating coastal geomorphic features associated with an indigenous archaeological heritage of less than 3000 years BP antiquity (Table 1). In particular, the “total bleach” TL-dating method employed in this study produced age determinations significantly older than all radiocarbon determinations made for comparable sand units. Due to the singular and/or combined limitations of the ‘total bleach’ TL-dating method noted above, it is expected that the “selective bleach” method (Prescott, 1990) would prove a more satisfactory TL-dating technique for the dune sequences of the study area. A test of this hypothesis is beyond the scope of this research project.
Figure 7.1. The study area (courtesy Jay Hall, University of Queensland).
Figure 7.2. Geology Map of Northern Deception Bay, southeast Queensland (after Grimes et al., 1986). Note the extensive (but undifferentiated) Holocene beach ridge systems and the location upon these where material was sampled for the thermoluminescence and/or radiocarbon age determinations.
Figure 7.3. Dune ridge profile, Wallace Road, Beachmere (Qhcb, at 27°07'00" S 153°02'30" E). Note that the TL and Radiocarbon age determinations are not in stratigraphic context.
Figure 7.4. Above, a sand extraction facility operating within the quaternary sand ridge system of Deception Bay. Below, artefacts exposed through bulldozing of Qhc₂ sand units within this sand extraction area.
Figure 7.5 Scanning electron microphotographs of sand grains (212-250μm in size) obtained from two sedimentary sub-environments within northern Deception Bay. Note these sand grains were pre-treated with HCl to remove carbonates, Calgon (sodium hexametaphosphate) to remove any clay coatings; and stannous chloride to remove any iron oxide coatings (cf. Bull, 1986) (all scale bars = 50μm). Image A: Sand grains from the modern tidal flats of Deception Bay. The grains are characterised by their sub-angular shape, smooth surfaces and the adherence of diatoms to their surfaces. The latter two features are associated with the precipitation of amorphous silica upon the surface of each sand grain. Image B: A sand grain from a depth of 85 cm below ground surface within the sedimentary profile of Wallace Road, Beachmere. In the top image note the rounded shape, abraded edges and dish-shape concavities apparent upon the surface of the sand grain. These features are reflective of Aeolian transportation of sand. In the bottom image note the significant solution pitting of teg grain surface. This is indicative of rapid and/or persistent in situ chemical weathering of sand grains.
Figure 7.6. Left, an SEM photomicrograph of an untreated sand grain from Wallace Road, Beachmere. The presence of a clay (note elevated Al) and/or iron (Fe) oxide coating on the grain is confirmed by the EDAX microprobe analysis graph of this grain shown at Right. Richard Bush and Stephen Cotter assisted with these SEM and microprobe analyses.
CHAPTER 8

REFINING AND QUESTIONING THE PALAEOGEOGRAPHIC MODEL II

THE LATE QUATERNARY STRATIGRAPHY OF NORTHERN DECEPTION BAY, SOUTHEAST QUEENSLAND: TOWARDS A SEDIMENTARY AND GEOCHRONOLOGICAL FRAMEWORK.

Maria Majella Cotter
School of Environmental Science and Management, Southern Cross University, Lismore, NSW.

Published paper


Concept and design of research

Concept: Cotter, M.M.

Project Design: Cotter, M.M.

Collection, analysis and interpretation of data

Collection of data: Cotter, M.M.

Analysis and interpretation of data: Cotter, M.M.

Writing

Writing: Cotter, MM

Proof reading and edits: Cotter, M.M.

Preparation of tables and graphics: Cotter, M.M. [except where acknowledged in the captions]
CHAPTER 8

REFINING AND QUESTIONING THE PALAEOGEOGRAPHIC MODEL II

THE LATE QUATERNARY STRATIGRAPHY OF NORTHERN DECEPTION BAY, SOUTHEAST QUEENSLAND: TOWARDS A SEDIMENTARY AND GEOCHRONOLOGICAL FRAMEWORK.

ABSTRACT
As part of a geoarchaeological research project a model of the Mid-to-Late Holocene evolution of the coastal environment of Deception Bay, a low energy coastal embayment in southeast Queensland, Australia has been developed (Cotter 1996). In particular, pollen analysis and both radiometric and thermoluminescence (TL) dating techniques were used to confirm a Holocene geomorphic history, predominated in the latter stages by coastal progradation and the intermittent formation of coastal lagoons. In this paper I report on the use of grain size analysis, scanning electron microscope (SEM) microtextural characterisation and previously derived TL data from sand facies within northern Deception Bay, as part of a continuing effort to further refine our understanding of the Quaternary stratigraphy of this area. One outcome of this additional research is the effective discrimination of an hitherto unrecognised Pleistocene dune sequence, that runs perpendicular to the present coastline, and which may be related to the formation of the Bribie Island sand sheet. Moreover, our understanding of the nature and mode of sediment transport in Deception Bay throughout the Quaternary is refined, and in particular the aeolian transport of Mid-Holocene dune sand is confirmed. This base-line geomorphic data is critical for informed environmental and cultural heritage management within northern Deception Bay and the wider Pumicestone Passage Catchment Area. More generally, this data has implications for archaeological research in coastal environments, and it is recommended that sub-regional analysis of geomorphic processes is critical to the development of precise understandings of the formation and preservation of the archaeological record.

INTRODUCTION
Deception Bay is a low energy coastal embayment situated approximately 12 km to the east of the township of Caboolture in southeast Queensland, Australia (Figure 8.1). It is the most northern mainland coastal element of the larger, more widely known Moreton Bay and as such its natural and cultural heritage values have been recognised by its inclusion within the Moreton Bay Marine Park (Queensland Department of Environment & Heritage, 1993a, b, & c).
The Late Quaternary stratigraphy of northern Deception Bay is characterised by a prograded sequence of Holocene beach ridges and low dunes fronted by tidal sand flats (Flood, 1980, 1981). The development of salt marsh vegetation, freshwater swamps and coastal peats in depressions between successive beach ridges reflects the occurrence of several episodic phases of accretion (Cotter 1996; Lang et al., 1998; McClure, 1995; McClure & Lang, 1996). These accretionary phases have primarily been associated with eustatic changes in sea level within Moreton Bay although fluctuations in the rate of sediment supply to the shoreline have also been suggested (Cotter, 1996; Cox et al., 2000; Flood, 1981; Jones, 1992b; Lang et al., 1998; Lester et al., 2000). Whilst the cessation of the Mid Holocene Marine Transgression has been causally linked to the most significant phase of shoreline progradation, for northern Deception Bay (Cotter, 1996, 1999; Flood, 1981; McClure, 1995) the mode of formation of this beach ridge system and complimentary swamp environments has not been adequately determined. In this paper, the size, distribution and textural characteristics of selected sediments featured within several of the depositional environments of northern Deception Bay - including tidal flat, foredune, estuary, lagoon, and beach ridge environments - are analysed in order to categorise the mechanisms of formation of these environments. When this data is considered with respect to radiometric and thermoluminescence age determinations of selected sediment facies (Cotter, 1996, 1999), a more complete understanding of the nature and timing of the environmental processes that have contributed to the formation of Northern Deception Bay, than has been previously modeled (Cotter, 1996; Lang et al., 1998; McClure & Lang, 1996), is achieved. It is only with such an
enhanced understanding of the environmental history of northern Deception Bay that present issues of environmental and cultural heritage management can be effectively addressed.

**GRAIN SIZE ANALYSIS**

The grain size distribution analysis of sands has proven effective in the discrimination of the sediment source characteristics and modes of deposition of beach and estuarine sediments (Guillén & Jiménez, 1995; Mason & Folk, 1958; McCave & Syvitski, 1991; Tanner, 1992, 1993). For littoral sediments such as those that occur within Deception Bay it is (i) the interplay of wave, tidal and aeolian transport processes coupled with (ii) variations in the incident wave energy at depositional sites as well as (iii) the influence of different sediment sources that results in spatial and temporal variations in sediment facies and in particular their grain size characteristics. This paper reports the results of granulometric analyses of sand sized particles from selected dune, tidal and lagoonal sediments within northern Deception Bay, and the wider Pumicestone Catchment Area (Figure 8.2). At each of 12 locations, e. 3 m sediment cores were obtained by manually driving PVC piping into the sandy substrate. From these, contiguous down core samples were removed for grain size analysis. All grain size analyses were conducted using an Endacott© sieve shaker with sieves set at ¼ phi intervals and all sieve data was analysed using the Graphic Measures of Folk and Ward (1957), particularly as these parameters have been previously used in similar studies conducted throughout Moreton Bay (e.g. Armstrong, 1990; Flood, 1980; Jones, 1992; Smith, 1979) and hence allow the opportunity for subsequent data comparison.

![Figure 8.2. The location of all sediment cores analysed in this study.](image-url)
RESULTS OF THE GRAIN SIZE ANALYSIS

Results of the granulometric analyses of all mainland sites in this study reveal there is a well defined separation between the coarse-grained, poorly-sorted Ningi swamp dune sands (and, to a lesser extent, the tidal flat and foredune sands of Godwin Beach and Deception Bay) and the fine-grained, well-sorted sands encountered at Wallace Road (Figure 8.3). In addition the uppermost sands from the Wallace Road dune proved finer than sands lower in the profile, a result consistent with the transport and deposition of aeolian sands at or near the dune front and, furthermore, a result consistent with anecdotal and observational evidence for the burial of Aboriginal artefacts within the principal Mid-Holocene dune system (Cotter, 1996, 1998). Also, the grain size data obtained from Pritchard Road falls within the environmental envelope characterised by the current lagoonal sediments at Bayside Drive and hence adds support to the notion of the repeated but intermittent occurrence of a tidal lagoon along the shores of Deception Bay throughout the Holocene (Cotter, 1996). For the non-mainland sites a similar separation between locations is observed (Figure 8.4). Hence the fine-grained foredune samples of southeast Bribie Island (Skirmish Point and Red Beach) are readily distinguished from the coarser, less-well-sorted sands more directly associated with Pumicestone Passage channel deposits.

Figure 8.3. Environmental envelopes highlighting the distinction between a dune ridge encountered within Ningi Swamp and the samples obtained from a location along an extensive dune ridge near, Wallace Road, Beachmere. The envelopes are defined using the 1st & 2nd graphical measures of Folk & Ward (1957).
Inclusive Graphic Standard Deviation

Inclusive Graphic Mean

South east Bribie Island
South west Bribie Island
Pumicestone Channel

Figure 8.4. Environmental envelopes showing the distinction between the foredune systems of southeast Bribie Island and the channel sands of Pumicestone Passage.

GRAIN SHAPE ANALYSIS

Scanning electron microscope (SEM) examination of quartz sand grains from different sedimentary environments has revealed that certain physical and chemical processes impose characteristic sets of surface textures on quartz grains (Krinsley & Doornkamp, 1973). Furthermore, these surface textural features, and the frequencies with which they occur, may be used to determine the sedimentary histories of the quartz grains examined (Bull & Goudie, 1987; Bull et al., 1987). Thus, to compliment the above-mentioned granulometric analyses of sandy sediments within the Pumicestone Passage Catchment area, SEM examination was utilised to categorise the surface textural characteristics of individual quartz grains within these sand assemblages. Following Bull (1986), 40 individual quartz grains from the 212-250μm fraction from c. 80-100 cm down core at: Ningi Swamp; Wallace Road; Deception Bay; Skirmish Point; and Pumicestone Passage were examined under the SEM. An additional sample from Wallace Road, obtained at a depth of 220cm was analysed so that a down core comparison could be made at this site. The presence or absence of 26 surface feature categories was recorded for each sand grain with the frequency percent occurrence of each surface feature category
calculated; the combined results for each location was compared statistically using principal component analysis.

RESULTS OF THE GRAIN SHAPE ANALYSIS

The frequency of occurrence of morphological, mechanical and chemical features noted on the sand grains assemblages examined in this study are summarised in Figures 8.5 and 8.6. Brief details of the results for three sand assemblages, notably Wallace Road (c. 100 cm), Ningi Swamp and Deception Bay are provided below. Results of the principal component analysis are not reported here but provide statistical proof that the uppermost sands from Wallace Road (c. 100cm) are dissimilar in surface texture characteristics to the Wallace Road sand assemblage obtained at 220cm. Moreover, the Ningi Swamp sediments are similar in shape characteristics to the 100cm deep sands from Wallace Road (Cotter unpublished data).

Wallace Road

For the sand assemblage obtained at a depth of 100 cm from the Mid-Holocene sand ridge at Wallace Road (Figure 8.5), predominant surface feature categories noted include edge abrasion (>75%), and dish shaped concavities (50-75%). These surface textural features, in association with the presence of reakage block of >10μm size and conchoidal fractures (of both < 10μm and >10μm size), indicate that the sand ridge at Wallace Road is comprised of quartz grains that have been subject to aeolian transport (Bull 1986; Krinsley & Doornkamp, 1973). Mechanical V pits (50-75%) are also common on grains from Wallace Road. V-pits are a surface feature frequently associated with low energy subaqueous processes and hence their presence upon the surfaces of this sand assemblage indicates that aeolian transport has been limited within a near shore setting. The significant occurrence of solution pits (> 75%), amorphous silica as precipitate (50-75%) and dulled surfaces (50-75%) indicate that the Wallace Road sand grains have also undergone a period of chemical dissolution and/or precipitation (Bull, 1986; Krinsley & Doornkamp, 1973; Saleh & Khalaf, 1982). The simultaneous occurrence of surface textures reflecting the effects of wind and solution processes upon grains, may reflect (a) the prior sub-aerial exposure of these sand grains when deposited as near-shore tidal sand flat deposits (as currently occurs within Deception Bay) followed by a period of aeolian transportation; or (b) the in situ chemical weathering of dune sand. The superimposition of solution pitting over dish shaped cavities as observed, indicates that chemical dissolution of these grains occurs after aeolian transport and hence is a post-depositional or diagenetic phenomenon. For the east Australian coast it has been noted that dune sands, having experienced long periods of weathering involving several stages of aeolian reworking and deposition, are dominated by chemical features including oriented etch pits, deep arcuate etch lines and angular breakage features (Pye & Tsoar, 1990). The lack of these features within the Wallace Road sand assemblage is suggestive of a lack of significant reworking in the deposits.
Ningi Swamp

The sand grains obtained from the Pleistocene dune at Ningi Swamp are variable in shape (rounded to angular) but of predominately medium relief (Figure 8.5). They are characterised by features induced by both chemical and mechanical action. Mechanical features include abundant (>75%) edge abrasion, fracture plates and large (>10μm) breakage blocks with common (50-75%) mechanical-V-pitting, and a noted presence (25-50%) of small (<10μm) breakage blocks, dish shaped concavities and straight and arcuate steps. Finally up to one quarter of all grains have surfaces characterised by evidence of complete grain breakage, and/or small conchoidal fractures and adhering particles. In combination these features, are indicative of aeolian transport of grains with the presence of V-pits indicating that this aeolian transport was initiated in proximity to a littoral/beach environment (Bull, 1986). The Ningi Swamp sand assemblage displays a greater percentage of rounded grains, each with greater percentages of fracture plates, large breakage blocks, complete grain breakage and adhering particles than Wallace Road. This may be a function of one or more of the following three factors: (a) greater wind strengths during periods of active mobilisation of sands; (b) longer-term exposure to wind transport; (c) greater transport distances from source to depositional environment.

Figure 8.5. Grain Shape summary diagram for: solid bars - Ningi Swamp, hatched bars - Wallace Road (at c. 100cm depth) open bars - Wallace Road (at c. 220cm depth).
Chemical features noted for the Ningi Swamp assemblage include abundant solution pits, dulled surfaces (50-75%), and silica precipitates (25-50%). These features are frequently superimposed upon mechanical features such as dish shaped concavities indicating that chemical action is currently the most active influence upon the surface morphology of detrital quartz grains at this location. Significantly the presence of deep pitting and dissolution etching along vein fractures in these quartz grains is indicative of persistent and probably long-term diagenetic effects.

**Tidal flat sand assemblage, Deception Bay**

The tidal flat sand assemblage consists of sub rounded to angular grains of medium relief. The most distinctive surface textural features of these grains are those caused by chemical action and include a >75% occurrence of solution pits, a 50-75% occurrence of amorphous silica precipitation and up to a 25% occurrence of euhedral silica precipitation (Figure 8.6). In addition diatoms occur as adhering particles on 50-75% of all grains examined. In some instances these diatoms are embedded and/or covered by layers of amorphous silica and hence are indicative of the occurrence of an authigenic process of precipitation and/or re-precipitation of silica upon individual quartz grains. This diagenetic process undoubtedly increases the size and alters the shape of the sands originally deposited on to these tidal flats.

Of the mechanical features observed, the tidal flat sand assemblage is characterised by a > 75 % occurrence of edge abrasion and fracture plates. For this sand assemblage, edge abrasion is identified on the majority of grains but it is a feature that has a narrow coverage over each grain surface, considerably less than for either the Wallace Road (100cm) or the Ningi Swamp assemblage. Likewise the significant occurrence of fracture plates is a more a function of the weak fracture of thin platy layers of amorphous silica rather than a function of significant mechanical impact. Furthermore, mechanical V-pits occur on a maximum of 50% of all grains examined from within Deception Bay despite this modern sand flat being a tidally inundated, subaqueous environment of which mechanical V-pits are considered diagnostic (Krinsley & Doornkamp 1973). This lack of mechanical V-pits is also most likely to be a result of the repeated draping of amorphous silica overgrowths over the grain surfaces.

**Dating anomalies**

A stratigraphic framework for the Mid-to-Late Holocene evolution of the coastal plain of northern Deception Bay has been previously presented (Cotter, 1996). This framework was derived using radiometric and thermoluminscence dating (TL dating) of sediment facies as well as detailed pollen analysis of acidic swamp sediments. However, the TL dating of these dune systems remained inconsistent with previously understood facies models (Cotter, 1999). In particular, the dune system through Ningi Swamp is aligned NW-SE, discordant with the main Mid Holocene dune system (Cotter 1996; Flood, 1981) along northern Deception Bay. Furthermore, a TL age determination of 211± 42 ka for this dune ridge indicated an antiquity much greater than previously recognized for this system – it
being previously mapped as Holocene in age (Qhcb) (Grimes et al., 1986). In addition, sedimentary units previously mapped as Pleistocene in age (Qpcb) at Pritchard Road (Grimes et al., 1986) were shown to be most probably Early Holocene in age (TL 10.9 ± 5 ka). These anomalies appear consistent with variation in grain shape and size characteristics noted in this study and the implications of this data are briefly discussed below.

DISCUSSION

When considered across the Pumicestone Passage two patterns emerge with respect to sand grain size. Firstly, the fine-grained well-sorted sands observed at Wallace Road are also reflected in the sand deposits of Skirmish Point, and Red Beach (southeast Bribie Island). Previous dating of the Wallace Road dune sequence has indicated its Mid-Holocene onset (Cotter, 1996). It is suggested that the southeast Bribie Island sand dune system accreted in a similar fashion to the Wallace Road dune and perhaps also in the Mid-to-Late Holocene. Secondly, and in contrast, the sediments of Ningi Swamp, Deception Bay and Godwin Beach are coarse-grained, poorly sorted sands typical of reworked lag deposits. Pumicestone Passage samples and the lower most samples from Bongaree also fit into this category. Given the Pleistocene age of the Ningi Swamp samples it is suggested that all these coarse
grained sediments are locally reworked relict elements of an extensive sand sheet that currently underlies Bribie Island. Thus it appears that the sediments currently observed within the Pumicestone Passage reflect the existence of two vastly different sedimentary regimes in operation during the Late Quaternary. Importantly the SEM analysis of the surface textural characteristics of these sediments enables a more detailed categorisation of specific sediment transport regimes and leads to the clear separation of (a) modern nearshore sediments (e.g. Deception Bay) influenced by considerable subaqueous chemical effects from (b) Mid-Holocene near-shore sediments subject over-time to limited aeolian activity (e.g. Wallace Road) and; (c) relict Pleistocene sediments characterized by severe chemical diagenesis and surface textural features that suggest substantial aeolian transport of littoral sands (Ningi Swamp).

CONCLUSIONS
The data presented in this paper refine current models of the Late Quaternary evolution of northern Deception Bay (Cotter 1996; Lang & McClure, 1996; McClure, 1995) and in particular contributes to our knowledge of the origin and transport history of the sandy facies that characterise the beach ridge and tidal flat sediments of this low energy coastal plain. Elsewhere, I have highlighted the importance of understanding the Holocene evolution of northern Deception Bay for effective management of Aboriginal Cultural Heritage in this increasingly development-prone coastal zone (Cotter, 1998). Understanding the nature and timing of sediment transport processes and depositional regimes is equally important in the development of management strategies for such catchment-wide issues as: the stability and/or replenishment of shorelines; the maintenance of fauna and flora habitat; the maintenance and sourcing of extractive resources and the maintenance of water quality within this Marine Park Conservation Zone (Low Choy, 1998). This paper provides base-line geomorphic data critical for informed environmental and cultural heritage management within northern Deception Bay and the wider Pumicestone Passage Catchment Area.
CHAPTER 9

SECTION I: RESEARCH OUTCOMES, WIDER IMPLICATIONS AND FUTURE DIRECTIONS

Maria Cotter

School of Environmental Science and Management, Southern Cross University, Lismore, NSW

Unpublished manuscript

2008

Concept and design

Concept and project design: Cotter, M.M.

Collection, analysis and interpretation of data

Collection, analysis and interpretation of data: Cotter, M.M.

Writing

Writing, proof reading and edits: Cotter, M.M.

Preparation of tables and graphics: Cotter, M.M.
CHAPTER 9

SECTION I: RESEARCH OUTCOMES, WIDER IMPLICATIONS AND FUTURE DIRECTIONS.

_The very meaning of sand lies in its shifting mobile quality, its responsiveness to climate and wind_ (Somerville, 2004: 100).

INTRODUCTION

This chapter briefly discusses the key outcomes of the geoarchaeological investigations conducted in northern Deception Bay and evaluates these findings in the context of their contribution to Aboriginal archaeological research within Moreton Bay in particular, and southeast Queensland more generally. The chapter also considers directions for future research where such geoarchaeological analyses could usefully be applied to further improve our understanding of the archaeology of southeast Queensland, and coastal archaeology within Australia. The chapter concludes by foreshadowing Section II.

OUTCOMES

The geoarchaeological aspects of this research project were focused on the elucidation of a Holocene palaeoenvironmental record for the coastal plain of northern Deception Bay and the assessment of the implications, if any, of this record on the formation and preservation of the rich, primarily Late Holocene, Aboriginal archaeological heritage known for this bay. In order to achieve this elucidation a multi-disciplinary methodological approach was adopted in which analytical techniques applied in the fields of geochemistry, palynology, geomorphology, sedimentology, mineralogy and environmental magnetism were used to explicate the past environmental conditions of Deception Bay. In an attempt to ensure that the palaeoenvironmental data gathered was directly applicable to the archaeological research questions posited, the conduct of specific analyses – though at times framed with reference to specialist analysts – remained throughout the sole responsibility of the author. The record of the use and understanding of the techniques applied is contained within the Appendices of Volume II. These data combine to substantiate the results as presented in the publish texts contained within Section I.

Key outcomes

The key outcomes of the palaeobotanical, geochemical and dating analyses are:

**Outcome 1:** The documentation of a 6000 year vegetation history for this coastal plain with evidence that elements of current wallum vegetation communities have been within this environment for at least this time period.
**Outcome 2:** The identification of structural and spatial differences in the coastal wallum vegetation through time at least in part due to the onset and impacts of the Mid-Holocene Marine Transgression on this coastal plain c. 5800 years BP.

**Outcome 3:** The identification of intermittent but repeated geomorphic processes being operational across this coastal plain throughout the Mid-to-Late Holocene, with the tidal lagoon system being a feature of episodic occurrence during this time.

**Outcome 4:** First qualified identification of potential acid sulphate soil conditions within this coastal environment.

**Outcome 5:** First identification of > 200,000 year component to the Quaternary sedimentary record of this coastal plain. The Pleistocene dune recognised within Ningi swamp is of equal antiquity to sand sheets associated with the onset development of Bribie Island within Moreton Bay.

**Additional outcomes**

The initial results of these analyses were combined to develop a palaeogeographic model of the Mid-to-Late Holocene coastal evolution of Deception Bay (Figure 9.1). In light of anomalies in the results of age determinations conducted on one of the sediment profiles and both anecdotal and observational evidence of a buried aspect to the Aboriginal archaeological record this palaeogeographic model was subject to further scrutiny and refinement using micromorphological sediment analyses; particularly the particle size and shape analysis of sand grains. The main outcomes of these additional granulometric and microtextural analyses of sand grains are summarised below:

**Outcome 6** Confirmation of aeolian activity during the Mid-to Late Holocene development of Deception Bay.

**Outcome 7:** Identification of evidence for the dissolution and re-precipitation of silica within the modern sedimentary environment.

**Outcome 8:** Detailed categorisation of variable sediment transport and depositional regimes within northern Deception Bay including (a) modern nearshore sediments influenced by considerable sub aqueous chemical effects; (b) Mid –Holocene nearshore sediments subject to limited aeolian activity; and (c) relict Pleistocene sediments characterised by severe chemical diagenesis and substantial aeolian transport of littoral sands. Identification and separation of
Archaeological implications

The outcomes of the scientific analyses were considered in light of the implications for the known archaeological record of northern Deception Bay and the following key points were made:

(A) The resource zones presently observable within Deception Bay (including estuarine mudflats, tidal lagoons, and Melaleuca swamps) existed in some form throughout the last 5,000 years and hence were available throughout this period for prehistoric human exploitation despite the lack of archaeological sites of this antiquity.

(B) Likely elements of the Mid-Holocene component to the regional archaeological record have been overlain with aeolian sands, rendering them invisible in the present landscape, and providing at least one environmental reason for the lack of observable sites of more than 2,500 years old in the area.
(C) The unconsolidated sediments of the estuarine mudflats and prograded dunes of the coastal plain do not provide likely raw material resources for stone artefact manufacture hence a lack of suitable geological outcrops for stone tool manufacture within northern Deception Bay likely impinged upon the nature and type of social interactions in which the prehistoric occupants of the area engaged.

Broader Outcomes
Though not explicit within the main text of Section I, an underlying achievement of this research programme was to obtain palaeoenvironmental data within an Aboriginal cultural landscape and apply this data to questions invoked by the archaeological resources known for the area. This overarching theoretical achievement is underpinned by an attention – at the sub-regional level – to the minutiae of environmental features such as sand grains and pollen microfossils as well as to broader based modelling of environmental fluxes.

Several of the results were also placed in the public domain, especially in the sphere of environmental planning and management, a sphere of particular relevance to the study area due to it being subject to significant and ongoing development pressures (e.g. Cotter, 1998, 2000).

Future Research Directions
In demonstrating that, with attention to the minutiae within coastal environments, a more robust and complete modelling of environmental conditions is enabled, this research points to the need for further sub-regional level environmental analyses within south east Queensland. Moreover, further scrutiny at the sub-regional level of the environmental context is required before environmental causation is summarily dismissed as a formative component of the archaeological record of the region (cf. Ulm, 2004). In this context this research cautions against further development of explanatory models for the archaeological record of south east Queensland, without a thorough and integrated understanding of the local environmental conditions in play at the key archaeological sites and/or site complexes within the region. The preliminary palynological studies noted to have been conducted on the Pleistocene site at Wallen Wallen Creek (e.g. Dudgeon, 1987) suggests that a committed revisiting of this site, focused on micromorphological sediment analyses, could commence the development of the environmental database that I perceive is required to best explain the archaeological record of Moreton Bay and southeast Queensland.

Contributions and Limitations of the Research
The research documented in Section I (and the associated technical reports contained within the Appendices of Volume II) of this thesis represents a quantitative geoarchaeological examination of the Aboriginal archaeological record of northern Deception Bay. Methodological aspects of this research
have been published and subject to scrutiny by national and/or international Quaternary and archaeological specialists (e.g. Cotter & Boyd, 1998, 1999; Lentfer et al., 2003). The key findings have also been published and subject to examination by national and/or international archaeological and Quaternary science specialists (e.g. Cotter, 1996, Cotter, 2002); and incorporated into the coastal archaeology literature for southeast Queensland and Australia (e.g. Hall, 1999). However a full paper synthesising the palynological, geochemical and sedimentological results has not been prepared for publication in a major journal such as *Sedimentology*, or *Journal of Coastal Research*, nor in an international geoarchaeological or landscape archaeology journal or volume. Likewise specific details of the research such as the component focused particularly on the archaeological record of the Sandstone Point Aboriginal Reserve, though presented at a symposia focused on the archaeology of Moreton Bay (Cotter, 2001) have not yet been formally published. These publication gaps primarily reflect the repositioning of my research focus from a critical science based analysis of archaeological landscapes, to the exploration of the contemporary practice of archaeology in the context of environmental management and contested terrain. This emergent research focus is the subject of Section II of the thesis.
SECTION II

DECEPTION, CONTEST AND MEANING: CONSIDERATIONS OF THE MULTIVOCALITY OF THE CULTURAL LANDSCAPE OF DECEPTION BAY, SOUTHEAST QUEENSLAND

Plate 7. Harvested *Pinus Elliottii* plantation, adjacent to southern boundary of a large *Melaleuca quinquenervia* swamp that was the subject of topographic survey for this thesis. The clearing of these pine trees revealed a midden precinct that was the subject of court proceedings in the Queensland Planning & Environment Court in 1995.
SECTION II

DECEPTION CONTEST AND MEANING: REFLECTIONS ON THE MULTI-VOCALITY OF THE CULTURAL LANDSCAPE OF DECEPTION BAY, SOUTHEAST QUEENSLAND

INTRODUCTION

...just as we recognise the multi-vocal and historically contingent engagement of past people with the world around them, so we have to recognize the multi-vocal and historically contingent nature of our own engagement (Bender, 1999).

In the emergent context of a real threat to elements of the Aboriginal cultural heritage resources of northern Deception Bay I had cause to extend the geoarchaeological research presented in Section I of this thesis into the sphere of contemporary social and cultural politics. The documentation and analysis of the catalyst for - and outcomes of - this extension of geoarchaeological research into ‘contemporary practice(s)’, particularly environmental and cultural resource management, is the primary focus of Section II.
The research documented in Section II might be considered to derive from a programme of ‘participatory action research’ (Huxham & Vangen, 2003; Cassell & Johnson, 2006); focused on investigating cultural heritage management strategies for the known Aboriginal heritage values of northern Deception Bay. However, the research presented here was never conceived to conform to a participatory action research model. It is true that it reflects observations and analyses that are the result of my participant activism (sensu Maxey, 1999) in legal proceedings surrounding a parcel of land within northern Deception Bay subject to proposed development. However, this activism was not a planned or expected extension of my geoarchaeological research. It was largely precipitated by social and political processes external to me but intimate to the location and landscape within which my research was focused. As such, it was framed in an ‘accidental present’ consequent upon the actions of a concerned resident of the area who noted my name, sought me out and provided me with information that I would have otherwise remained unaware of - or at least unaware of in the time period available for me to become a useful participant in his wider community activism. It was facilitated by a personal ethic to question information that based on my particular knowledge I believed to be incorrect. Yet I am certain that, if at the time of my initial engagement with the local community of Beachmere, the information they had provided had been about a parcel of land beyond my study area and/or beyond my estimate of my expertise I would not have become involved. This is the hindsight reality. I remain appreciative of the impetus provided by this local community to challenge my research, and to extend my situatedness within the locale of Deception Bay from “objective” researcher to participant “other”. It has enabled me to further explore the cultural landscape of northern Deception Bay and pushed me towards recognition of the multi-vocality of this landscape.

Nevertheless the ‘otherness’ of my participant activism should not be discounted in this process. Deception Bay was not, and is not, my place. All my associations with the people and environment of the area, although intimate and affectionate, derived - and continue to derive - from that place being the subject of my research. Unlike the intimacies of connections developed for Moreton Bay by Oodgeroo of the tribe Noonuccal, as outlined in the Prologue to this thesis, I have actively only engaged with the locale of Deception Bay in the context of my personal negotiation of a research identity. Today I am both geographically and socially very much detached from this locale. For me, this detachment has both facilitated and hindered the self-reflexive gaze required to achieve the nexus between nature and culture that this same activism has identified as being necessary to achieve the broadest understanding of the cultural landscape of northern Deception Bay. This is so since it has enabled the externality of gaze required to make participant observations but has reduced the links to on-ground cultural practices that might have continued to inform this same gaze. This acknowledgement of contingency is both the challenge for and the vulnerability of this research. These vulnerabilities
and challenges are contextualized within wider disciplinary explorations of emotional, situated and ethical geographies (e.g. Bondi, 2005, Brock 2005; Maxey, 2005) which will be briefly revisited at the conclusion of this Section of the thesis.

Section II is comprised of six (6) chapters of published and semi-published material. It commences with two chapters that are comprised of documents that were material to legal proceedings in the Queensland Planning and Environment Court in the Mid 1990s. The following four chapters derive from my ‘participant activism’ in these court proceedings, and/or my later attempts to critically evaluate the multiple meanings and values ascribed to the landscape of northern Deception Bay in the context of these legal proceedings. Each chapter is briefly discussed below.

Chapter 10 is a critique of a cultural heritage assessment presented in an Environmental Impact Statement (EIS) prepared in support of a sand extraction proposal near Beachmere northern Deception Bay. It represents my original submission to Caboolture Shire Council in which I detailed my objections to the Aboriginal cultural heritage assessment of Lots 162 & 163 Beachmere, as presented in the EIS. The submission is self-explanatory as to the context of its development. Its content largely reflected the results of my field work observations and preliminary geoarchaeological analyses of northern Deception Bay at this time. The submission was independently reviewed by an experienced consultant with prior knowledge of the archaeology of the immediate area who expressed the view that the issues I raised were substantive and of ‘sufficient range and scope’ to cast serious doubts on the original cultural heritage assessment report (Haglund & Associates, 1995). This reviewer also concurred with other of my interpretations, stating that:

Any future research design for the cultural heritage of the general area – and the present study area within this- should review Ms Cotter’s paper and incorporate the main points made by her in research questions to be addressed. Of particular importance, and hard to dispute, is her view that the general Beachmere-Goodwins Beach-Toorbul Point area comprises one or more complexes of Aboriginal sires and the need for a regional review following logically from this (Haglund & Associates, 1995)

Ultimately, the reviewer concluded that “neither the cultural heritage assessment presented in the EIS nor the supporting report and the response to objections prepared …provide sufficient information to support an approval of the proposed sand extraction”. On this recommendation and in light of the fact that over 2000 objections to the EIS were lodged [my submission was recorded as objection No. 2035] Caboolture Shire Council rejected the sand extraction proposal.

This reviewer also made comments as to the personal style of my submission and made a general observation that my criticisms of the consultant who conducted the original
investigations were personalised. I was surprised at this comment, as it was not my intention to make a ‘personal’ attack, and indeed, as I had not yet met the consultant whose work I was critiquing believed my writing to be expressing a professional viewpoint rather than a personal one. With hindsight, and in light of the review offered, I would concur that the language I used could have been misconstrued as a personal attack. Such hindsight acknowledgement - the self-reflexive gaze – draws attention to the fact that I was naive to the process, and under confident as to the practice of archaeology in this public sphere. Such review, and greater experience, affords me this circumspection.

Chapter 11 represents a revision of the submission I had made to Caboolture Shire Council. This revision was made under instruction from a Barrister [acting on behalf of the Beachmere residents] during the development of this material for presentation in court proceedings precipitated by an appeal to the Queensland Land & Environment Court by the developers upon the rejection of their development application by the Caboolture Shire Council. This revision placed greater emphasis than the original submission on detailing the concept of ‘cultural landscapes’ and argued more clearly for the need to assess the midden precinct in Lots 162 & 163 Beachmere as a primary contributor to the cultural landscape of the Beachmere area, rather than as just another midden readily dismissed because of the ubiquitous nature of such materials in southeast Queensland.

Unlike the original submission, but as advised, this report made no reference to the processes of consultation with Aboriginal community members that had lead to the decision making with respect to the particular Aboriginal cultural heritage values identified for Lots 162 & 163. In the prior submission, I had maintained that the processes of consultation documented in the EIS were not equitable as only one out of the three Aboriginal groups claiming an association to the cultural landscape of northern Deception Bay had been consulted. Despite its omission from my report, concerns over the inequity of this consultation were raised at court both by me and by other parties to the proceedings (particularly the Foundation for Aboriginal and Islander research Action FAIRA). It was not a view supported by the Judge hearing the appeal who expressed the view that the Aboriginal groups claiming they weren’t consulted had, at Court, an evidentiary onus to show that they ought to be consulted (State Reporting Bureau, 1995: 476). Moreover since they were being allowed to express such views in Court, they had been provided with the opportunity to highlight their issues in the determination of the matter.

I remain unwavering in my view that the proceedings at Court were not an equitable continuation of the many spheres of negotiation that could occur to effect the involvement in the decision making processes of all Aboriginal community groups with an interest in Lots 162 & 163 Beachmere. This is because the fundamental structure of any Court is adversarial, not
consultative. Further, as the Judge maintained that it was first required that those groups not previously consulted had to demonstrate the evidentiary proof of their rights to be consulted their position was immediately one of necessary defence against claims of potential falsehood. My own experience as an ‘expert witness’ at these proceedings were that it was extraordinarily intimidating to walk into the Court for the first time as a witness to be confronted by 5 separate Barristers all in Court regalia one of whom, acting for the State of Queensland (a Labor government at this time) was a former Liberal Deputy Premier of that State. I quickly concluded that I never wanted to commit a criminal offence, as I was in the relatively benign Planning & Environment Court but still felt that as an expert witness my personal credibility [rather than, but in addition to, my professional credibility] was being questioned, particularly by the Barrister acting for the appellant. I recall being so introspective and overwhelmed by the activity in Court that at the end of my first day of questioning when travelling home by train I failed to get off at the appropriate station, only realising my mistake some two stations further down the tracks.

The recounting of my personal involvement and response to these Court proceedings serves to reinforce the ‘situatedness’ of knowledge as experience, ‘situatedness’ that herein is the result of the immediate intersection of the personal with the professional as my participant activism. Chapter 12 reflects my first attempt to move out beyond mere active involvement in legal proceedings to consider the social and political dimensions of the Aboriginal cultural heritage values of northern Deception Bay. Drawing on my then recent readings in social construction theory (e.g. Jackson & Penrose, 1993) – and with reference to my prior undergraduate training in human geography where the geographical exploration of ‘mental maps’ or ‘schemata’ had piqued my interest (Walmsley & Lewis, 1994) – in a conversation with my supervisor I coined the term “cognitive ownership” to explain and explore the multiple meanings ascribed to the cultural heritage of northern Deception Bay. The term cognitive ownership, as developed was used to recognise, describe and explore the reality of the multiple meanings and/or values being ascribed to the heritage of northern Deception Bay – particularly in its court based manifestation as contested terrain – without the need to assess the empirical validity of these meanings and values. Using the Aboriginal heritage of northern Deception Bay as a key case study the paper asserts that assessment of the cognitive ownership of a heritage place allows the identification of the particular social, cultural, economic, political and physical frameworks from within which a group or individual has constructed its meanings of that heritage site or place. Moreover, it argues that such identification is critical to the development of more complete understandings and wider options for management and protection of cultural heritage resources.

Chapters, 13 and 14 are published papers that further reflect on the social construction of landscape values evident within the contested terrain of northern Deception Bay (as per Chapters, 10 and 11). Through recourse to colonial and postcolonial discourses, these papers
consider the notions of “alien” and “other” and situate these notions within the ethnographic, archaeological and contemporary environmental landscape descriptions of northern Deception Bay. In doing so the two papers highlight the ways in which the continuous renegotiation of space has worked to marginalise this landscape and to effectively minimise the Aboriginal cultural heritage values embedded within it. In so doing these two papers highlight that cultural heritage values are of necessity historically contingent, dynamic and situation specific.

Chapter 15 is a multi-authored paper in which the ideas of ‘cognitive ownership’ as first developed to explore the intersection of the cultural landscape of northern Deception Bay and the Queensland legal system are expanded to consider other case studies; and heritage more broadly. In the introduction to the edited volume in which this paper was published, the paper is specifically acknowledged to

“...argue powerfully for accepting the inherent validity of diverse meanings and propose that resource management adopt a more fluid and multi-vocal approach to determining significance” (Mathers et al., 2005: 11).

Chapter 16 reviews Section II of the thesis by identifying the key outcomes of my negotiation of an ‘accidental present’ in which through ‘participant activism’ a more situated, self reflexive exploration of the cultural landscape of northern Deception Bay has been achieved. The chapter briefly moves to consider the wider implications for cultural heritage management of the use of the notion of ‘cognitive ownership’ especially in enabling the multi-vocal and contested nature of cultural heritage landscapes such as northern Deception Bay to be demonstrated and explored.

Chapter 17 provides a brief overview of the outcomes of Sections I and II of this thesis and considers these outcomes in light of the overall aims of this research. It also provides the statement of linkage to the thesis Epilogue where some concluding remarks are made.

Publications associated with this research topic:

Publications


Reports


Paper and poster presentations

Paper Abstract


Plate 9. North Godwin Beach, Deception Bay, southeast Queensland. My husband Stephen and youngest daughter Elian sit on a seat looking across Deception Bay towards Redcliffe in the south. Beside them is a stone monument to Charles Godwin, a pioneer of fish cannery works in Deception By and Pumicestone Passage after whom the beach is named. From the contemporary seating to the stone monument the outward gaze here is one in which only the European heritage of this place is readily discerned.
CHAPTER 10

CONTEST AND LANDSCAPE I: THE OBJECTION

THE PROPOSED BEACHMERE SAND EXTRACTION SITE: A REPORT TO THE CABOOLTURE SHIRE COUNCIL (WITH DETAILED COMMENTARY ON THE CULTURAL HERITAGE ASSESSMENT SECTION OF THE BEACHMERE SAND EXTRACTION EIS, MAHER & ASSOCIATES, NOVEMBER 1994)

Cotter, M.M.
School of Environmental Science and Management, Southern Cross University, Lismore, NSW.

Unpublished report

1995, January. [Later admitted into the Public Domain as a Court Document in Planning & Environment Appeal No. 221 of 1995 Harrison & Genry vs Caboolture Shire council & Ors, Qld Planning & Environment Court Brisbane].

Concept and design of research

Concept: Cotter, M.M.

Project Design: Cotter, M.M.

Collection, analysis and interpretation of data

Collection of data: Cotter, M.M. [with in field assistance from Stephen Cotter]

Analysis and interpretation of data: Cotter, M.M.

Writing

Writing, proof reading and edits: Cotter, M.M.

Preparation of Tables and Graphics: Cotter, M.M. (except where acknowledged in the captions)
CHAPTER 10

CONTEST AND LANDSCAPE I: THE OBJECTION

THE PROPOSED BEACHMERE SAND EXTRACTION SITE: A REPORT TO THE CABOOLTURE SHIRE COUNCIL (WITH DETAILED COMMENTARY ON THE CULTURAL HERITAGE ASSESSMENT SECTION OF THE BEACHMERE SAND EXTRACTION EIS, MAHER & ASSOCIATES, NOVEMBER 1994)

REPORT SUMMARY

This report is written in opposition to the recently released Beachmere Sand Extraction Environmental Impact Statement (EIS), (Maher & Associates, 1994) which recommended that a sand extraction operation proposed by Pumicestone Resources and Investment Trust Ltd be approved. The basis for this opposition to the EIS is that the Cultural Heritage Assessment Section of the Document (Chapter 14) is seriously inadequate. The major inadequacies of this section of the EIS are summarised below.

1. In principle the EIS adopts the recommended strategies for the enhancement of the relationship between Aboriginal Australians and the Mining Industry as proposed by the Mining Committee of the Council For Aboriginal Reconciliation (Council For Aboriginal Reconciliation, 1993) Yet the EIS lacks credibility because consultation did not occur with all sections of the Aboriginal community. Therefore the practice of reconciliation in this case has not reached fruition. The EIS has been conducted in a framework of negotiations which have operated to disenfranchise sections of the Aboriginal community.

2. The ethno-historical record presented is a superficial account which neglects to illuminate the extreme cultural significance of the area to members of the Kabi language group. Documentary evidence highlights the fact that important mortuary practices were conducted within the Beachmere area and these practices were clearly associated with campsites and pathways in the vicinity of the Beachmere sand dune system.

3. The possible discovery of Aboriginal skeletal remains during sand extraction is inadequately acknowledged in the EIS, and simply not addressed in the detail required for an appropriate understanding of this issue. In addition, the EIS fails to provide any recommendations with respect to the implementation of a monitoring strategy for the likely occurrence of burials within the dune system. Similarly, no plan for mitigation is proposed in the event of such a discovery despite the fact
that complex and protracted negotiations between Aboriginal groups, developers and government officials might be expected to result from such significant archaeological finds.

4. The presentation and interpretation of the regional archaeological record is misleading and fails to highlight the important environmental context of the "midden precinct" in Zone A of Lot 163. As a consequence the assessment of cultural significance of this site lacks appropriate detail.

5. The site interpretation presented for Lots 162 & 163 is ill-informed and poorly researched. Insufficient research into the historical context of pine plantations within south east Queensland (especially in terms of their establishment) results in the level of site disturbance for this area being exaggerated. A fact also confirmed by an informed geomorphological analysis of the ridge system contained in Zone A.

6. The placement of this "midden precinct" within the context of the ethno-historical record, coupled with other recently reported artefact scatters suggest that it is in fact part of a site complex associated with a major ridge system dated to 5,000 years old. On this basis alone, it can be isolated as a unique feature of the cultural record of the Beachmere region, and therefore worthy of preservation.

7. The report concludes by reiterating the inadequacies of the Cultural Heritage Section of the EIS. Further, it recommends that the permit application for proposed sand extraction submitted by Pumicestone Pacific Resources and Investment Trust, not be approved. In addition it is recommended that Council, in consultation with the Aboriginal community, take action to preserve the midden precinct located in Zone A of Lot 163, for the benefit of the entire community.

INTRODUCTION
As a consequence of consultation with the Beachmere Community Association and members of the Gubbi Gubbi Aboriginal community this report is written in support of their objections to the recently released Beachmere Sand Extraction, Lots 162 and 163 Environmental Impact Statement (EIS) (Maher & Associates, 1994).

From the outset it is pertinent to note that the views expressed here are entirely my own and that these views have been formulated as a result of extensive field work undertaken by myself, in the Deception Bay area, from October 1992 to the present. This fieldwork forms the basis of a Master of Science research topic entitled Environmental Archaeology and the Palaeoecology of Deception Bay, Southeast Queensland. This research is being pursued in the Faculty of Resource Science & Management at Southern Cross University, Lismore NSW and the resultant thesis is due for completion in August. In addition, the information provided here is given voluntarily and without the
financial assistance of any local interest groups. My sole reason for providing this information is a genuine concern for the continued preservation of the Cultural Heritage of Queensland, especially where, as in the Deception Bay area, it is becoming increasingly under threat from development.

The main focus of this report is on that part of the EIS entitled *A cultural Heritage Assessment of a Potential Sand Extraction Site, Peel Road, Beachmere, Southeast Queensland* (Wallin, 1994). The report aims to highlight the numerous inadequacies of this Cultural Heritage Assessment. A brief commentary on the geomorphological and environmental context of the land parcels subject to the lease application is also provided with the intention of (a) placing the immediate archaeological record within the context of the regional environment and (b) providing information regarding aspects of the local environment which require rigorous management if the sand extraction is to proceed.

As indicated, this report is presented to the Caboolture Shire Council in an attempt to redress some of the inadequacies of the EIS document. It is hoped that the presentation of this report will allow the Council to make a thoroughly informed decision with respect to the proposed sand extraction operation. It is my view that the cultural heritage record of the Beachmere area, both in the immediate and near vicinity of the presently proposed sand extraction site is **highly** significant and worthy of considerable research and preservation. It is for this reason that the report recommends that the sand extraction application, by Pumicestone Pacific Resources and Investment Trust, not be approved.

**BACKGROUND TO THE REPORT**

My involvement in the objection phase of this EIS is quite recent. In fact I was unaware both of the EIS and the nature and extent of the proposed sand extraction lease until I was phoned by Mr John Goodman of the Beachmere Community Association on Friday the 9th of December 1994. Mr Goodman had located my name in the minutes of a Caboolture Shire Council Meeting held on the 26/4/94 in which the presence of shell material within the area of Mining Lease Application (TPLN 631/3) Austex Mining NL was discussed (Caboolture Shire Council, 1994).

I believe that this information would have been supplied by the Caboolture Shire Council Environmental Officer, Mr Peter Loose who I met with on the 8th April 1994 with regard to me seeking Council support for a proposed Queensland Estate Heritage Grant Application. The Grant Application (which was unsuccessful) was proposed to survey and review the Aboriginal cultural heritage of the Toorbul Peninsula. In discussions with Mr Loose I mentioned archaeological material I had observed within the perimeters of two existing sand extraction operations, known to me as Bribie Industrial Sands (BIS) and Pioneer Sands respectively.

Subsequent to this discussion I was contacted on the 12th of April by Mr Cyril Spann of the Department of Minerals and Energy with regard to my knowledge of archaeological material within
the boundaries of the present operations of Bribie Industrial Sands. The purpose of Mr Spann's enquiry, as I understood it, was to discuss the nature and extent of the archaeological material I had noted. This was because, as he informed me, BIS had submitted a mining lease application that would extend the western perimeter of their operations. I duly sent Mr Spann the details I had of the archaeological material and was not contacted further in this regard.

One other phone conversation that I have recollection of was from Mr Greg Cleary. Unfortunately I did not note the date of this conversation but believe it to have been within the second half of last year. Mr Cleary's enquiry was somewhat enigmatic but asked me of my knowledge of archaeological sites within the Beachmere area. I now presume his enquiry was with reference to the area addressed in the EIS, but at the time I concluded that he was referring to an area to the south of the Beachmere township and I therefore stated that I had no knowledge of any archaeological sites within that area. This was the only time I was contacted by any party who I now know to have been involved in the EIS formulation process.

As a result of Mr Goodman's phone conversation with me it was arranged that I meet with him and Mr Cyd Williams of the Beachmere Community Association, at his residence in Bayside Drive Beachmere, on the morning of Tuesday the 13th of December 1994. Immediately prior to this meeting I purchased a copy of the EIS from the Town Planning Department of the Caboolture Shire Council. Upon my arrival and familiarisation with the details of the EIS, I was motivated to address a public meeting that same evening in which I outlined my concerns for the Cultural Heritage of the Beachmere area stating that ‘the EIS could be challenged on both environmental and archaeological grounds’. The basis of my comments formed a (perhaps sensationalised) report in *The Caboolture News* December 16, 1994 (Oxford, 1994b).

Since this time I have engaged in more research that emphatically confirms my opposition to the findings of the EIS especially in regard to the Cultural Heritage Assessment provided in this document. It is this research that forms the basis of the following report.

**ABORIGINAL COMMUNITY CONSULTATION**

Whilst I think this is an issue better addressed by the Aboriginal Community groups themselves, I wish to make some comment on the failure of the EIS to involve all Aboriginal community groups concerned.

In principle the EIS adopts the recommended strategies for the enhancement of the relationship between Aboriginal Australians and the Mining Industry as proposed by the Mining Committee of the Council for Aboriginal Reconciliation (Council for Aboriginal Reconciliation, 1993). Yet members of the aboriginal community have publicly stated that the EIS lacks credibility because consultation did
not occur with all sections of the Aboriginal community (Hinds & Williams, 1994; Oxford, 1994a; Fesl, 1994, pers. comm.; Bond, 1994, pers. comm.). Therefore it seems that whilst the principle of Aboriginal reconciliation has been invoked, the practice of such reconciliation in this case has failed.

The EIS has been conducted in a framework of negotiations which have operated to disenfranchise sections of the Aboriginal community. Thus the financial benefits proposed for the community, including assistance in establishing a keeping place on Bribie Island, can not be seen to be either desired by the entire Aboriginal community nor of assistance to the entire community. Moreover the suggested establishment of a keeping place on Bribie Island, with funds derived from the permitted removal of sites in Deception Bay, denies the opportunity for any real recognition of the extreme local cultural significance of the Deception Bay/Beachmere area to the Aboriginal community. In this regard before any further action is taken on behalf of Council with respect to the sand extraction lease application, a minimal requirement should be that the Aboriginal community consultation process begin afresh. In this way Council may allow itself an opportunity to adopt a strategy which takes practical steps towards Aboriginal reconciliation. Acceptance of the present form of the EIS is certain to promote unnecessary Aboriginal confrontation.

**THE ETHNO-HISTORICAL RECORD**

Wallin (1994) presents an overview of the ethno-historical record of the activities of Aboriginals within the Deception Bay area. Whilst this overview is superficially comprehensive it fails to detail activities which highlight the immense significance of the area in the immediate and near vicinity of the land parcel subject to a sand extraction permit application. Below is some of the historical record for the Beachmere area that should have been presented in the cultural heritage assessment section of the EIS. It is evidence that specifically highlights the immense cultural significance of the area presently subject to a sand extraction permit application. This is of course over and above the regional evidence for the Aboriginal cultural significance of the Deception Bay area, as documented by Wallin (1994).

Steele (1984) writes that an Aboriginal clan migrated frequently between their headquarters at Ningi Ningi (Toorbul Point) and Redcliff. He also makes comment on the visit to Toorbul Point by the Reverend Christopher Eipper between 2 and 13th August 1841 which was published in the *Colonial Observer* 14 and 21st October 1841 (Steele, 1984). In the context of the Beachmere area Steele's commentary is significant because he clearly indicates that the area was part of the central pathway used by the Ningi Ningi clan for their travels from Redcliff to Toorbul Point:

> Next day the missionaries crossed the North Pine River, and in the afternoon they had a view of the Bay, 'and to the right the path to Umpie Bong or Old Settlement was pointed out; but as there was no smoke visible, our guides concluded that the natives of that place had gone to Toorbul, which is the native name for Ninga Ninga'. The missionaries crossed Burpengary Creek and the "Kaboltur" river camping on the banks of the latter.
They next travelled along the sandy beach of Deception Bay, then turned inland and crossed a ‘very disagreeable swamp well nigh a mile long’ in which women were digging dangum (fern-root known at Toorbul Point as Bungwall). At the Toorbul Point camp, women were seen returning with oysters gathered from islands in Pumicestone Passage. After much pounding of dangum, both dangum and oysters were roasted for the evening meal (Eipper, 1841 cited in Steele, 1984:166-167).

From this description it is possible to assert that the ‘most disagreeable swamp’ that Eipper encountered and the Ningi Ningi clearly passed through and utilised, is the large *Melaleuca quinquenervia* wetland located due south of the Toorbul Point Bora ground at Bestman Road, Ningi (Figures 10.1 & 10.2). A field survey of this wetland conducted during 1993 & 1994 has established the present length of this wetland area to be 1.8 km (Figure 10.3) and for much of its length *Blechnum indicum* (Bungwall) dominates the understorey.

This wetland does not have a uniform topography, it is dissected in parts with southeast draining channels, and a predominate sand ridge forms a high point within the area. A single artefact and a sparse scatter of shell material have been noted on top of this sand ridge. It is therefore likely that high points within the wetland enabled it to be trafficked by Aboriginal groups, and that they have done so in the past is evidenced by artefactual material observed within the swamp.

Similarly Uniake (cited in Steele, 1972) presents details of a fight among the natives of Moreton Bay, witnessed by John Finnegan in November 1823. This fight occurred at a ceremonial ground within the tribal lands of a clan "five and twenty miles" to the southwest of the natives at Pumicestone River (situated at Toorbul.), which can be interpreted to be at least in the vicinity of the Redcliffe Bora Ground (Steele, 1972). Finnegan's account of the death of two of the Pumicestone River clan during this fight is significant to the Beachmere area because it clearly associates the area with Aboriginal mortuary practices:

*Just before dark I saw a large crowd approach, who (it seems) were bringing the bodies of the two men who had been killed. They laid them down ...and began a great lamentation over them. The first body was completely flayed, but they had not yet had leisure to skin the other. ... Two large fires were lighted where the bodies lay, in which, as I judged from the noise, as well as the offensive smell, they were both consumed. Immediately after this our whole party decamped; and having travelled more than half a mile, we stopped for the night. Very early next morning we again started, and travelled all day with great expedition, without ever halting or eating anything.......I had observed, during this day's march, two men, .....each of whom carried something on his shoulder, but did not keep the same path with us, walking through the bush at a little distance abreast of us. .....We travelled that day about eight or ten miles, and toward evening arrived at the edge of a large swamp, where we halted, and huts were instantly erected by the women, who were afterwards obliged to go out and procure fern-root for the whole party...I lodged as usual with the chief, at a little distance from whose hut I observed the two men hang up their burthens....... (cited in Steele, 1972:77-83).*

*9 In this chapter all Figures are presented at the end of the text, as in the original report.*
Before continuing with this narrative, it is important to note that Finnegan's placement of this swamp some ten and one half miles (approximately) from the visiting party's camp at the Redcliffe Bora Ring suggests that the swamp is also the wetland area due south of the Toorbul Point Bora Ring. This interpretation is based on the expectation that the Pumicestone River clan, mourning the death of two of their party, did not walk south or west into the area of the clan whom they had been in battle with, but that they retreated north towards Toorbul. Lending support to this evidence are personal observations of midden material located on the sand dunes immediately to the east and southeast of this wetland area. Furthermore, the archaeological site identified by Wallin (1994) in Zone A of Lot 163 is in fact situated on the most immediate and most substantial dune to the southeast of the wetland area. It should also be stated that the ‘expeditious’ nature of the grieving Aboriginal party's trip to the wetland campsite suggests that it was a purposeful journey, i.e. it was the specific intention of the group to arrive at the wetland campsite in order to complete their mortuary rituals.

Finnegan (cited in Steele, 1972) goes on to state that the party camped beside this swamp for two days during which time a fire was kept burning underneath the site where the two ‘burtherns’ had been hung. Against the wishes of members of the Pumicestone River clan Finnegan persisted until he had ascertained that the burtherns were in fact the skins of the two men who had been killed. On the evening of the second day at this campsite Finnegan witnessed what were clearly the final funeral rights of the two deceased.

...... Shortly afterwards, all the men dressed themselves in kangaroo skins, and one of them in an old rug jacket which I had, and with one or two women, held a consultation round the fire, each person having a fire-stick in his hand. After conversing about half an hour, two of the party separated from the rest, and having taken down the skins, set off at full speed through the bush; the rest followed, shouting and making much noise. After this I saw nothing more of the skins, nor do I know what became of them. In about three-quarters of an hour the party returned.... The next morning we returned to the Pumicestone river....and the natives followed their usual occupations ..as if nothing had happened (cited in Steele, 1972:82)

The final point to be made with regard to Finnegan's observation is that the mortuary practices surrounding this incident cannot only be determined to have occurred within the immediate locale of Beachmere, the actual site of final placement of the skins of the deceased, within the landscape, must have occurred within a short distance of the described campsite. Thus the area has been historically documented to have been of immense Aboriginal cultural significance.

**ABORIGINAL BURIAL SITES**

It seems ill considered that within the EIS no reference is made to the possibility that the beach ridge which passes through Lots 162 & 163 (and which are presently subject to sand extraction activities to the north east) may contain Aboriginal burials. This ‘oversight’ is even more remarkable when
considered in light of the fact that McNiven (1991) reported the discovery of two burials within sand dune deposits of the Cooloola region. The Cooloola region, like Deception Bay, is documented to be Kabi territory (Steele, 1984) and thus one would suspect that similar mortuary practices persisted throughout the Kabi Territory. Moreover as Flood, P. (1980, 1981, 1983, 1984) indicates, the sand dunes are part of a transgressive sequence, deposited c. 5,000 years ago.

To my knowledge no human skeletal remains have been yet detected within the sand dune system subject to sand extraction at Beachmere. However it would be careless practice, in light of the evidence from Cooloola, not to have a mechanism in place in which the discovery of skeletal remains during sand extraction could be monitored. This, by necessity, would require the formulation of a mitigative plan whereby the cessation of sand extraction, Aboriginal community consultation and assessment by state government archaeologists occurred immediately upon discovery of such remains. Certainly the recent Sand Fly Creek controversy near Townsville, where the issues of sandmining and the discovery of Aboriginal burial sites have proven difficult to resolve (Penny Cooke, Department of Environment and Heritage, *pers comm.*), highlight the fact that such monitoring and mitigative strategies should be an integral part of any sand extraction application.

It is a fundamental failure of the EIS that this issue of Aboriginal burial is not adequately addressed. Despite a recommendation in the EIS that the regional Manager (Cultural Heritage Program) be contacted if any further cultural heritage items be discovered during development, and a noted prediction of the possible future discovery of burial sites, the sensitivity of this issue and its broad implications have not been outlined. The discovery of Aboriginal burials invites the possibility of protracted negotiations, permanent cessation of mining activities and or prolonged delays in mining, and therefore must be an issue of concern not only to the Aboriginal community involved but it must also present potential economic problems for the developers concerned. The failure of the EIS to clearly outline the real possibility of the discovery of Aboriginal burial sites, and their likely effects on mining operations, must undermine the developer's ability to adequately assess the financial risks involved.

**THE REGIONAL ARCHAEOLOGICAL CONTEXT**

The documentation and interpretation of the regional archaeological record provided in section 14.3.1. of the EIS (Maher & Associates, 1994) is misleading. One reason for this results from the fact that prior to the initiation of *The Moreton Region Archaeological Project* (MRAP) in 1977 by Dr Jay Hall of the University of Queensland (Hall, 1980; Hall & Hiscock, 1988), no systematic archaeological investigation had been conducted within this part of the Moreton region. Although, as indicated in the EIS, an archaeological survey and excavation had been conducted at Sandstone Point by Laila Haglund between 1970 to 1972 (Hall, *et al.*, 1987).
MRAP commenced some years after the introduction of exotic pine plantations to the Deception Bay area. The first implication of this fact being that no substantial archaeological survey had been conducted before the pine plantations were established in the Beachmere area. Even with the systematic archaeological investigations advocated in MRAP, the extent of land surface covered by these plantations would have considerably reduced both the accessibility and the visibility of archaeological sites within the area (cf Hall et al., 1991). Moreover these plantations were established well before land developers were required to assess the environmental impacts of their proposed developments. In this way private land development was (or could be) achieved without due consideration for the archaeological record.

It is known that two systematic surveys have been conducted in regions planted to exotic pines on Bribie Island, under the supervision of Dr Jay Hall (Hall et al., 1991). To my knowledge no such systematic survey has been conducted throughout the Beachmere region. Thus it can be stated that one reason why most of the recorded midden sites in the Deception Bay/Bribie Island area occur on Bribie Island is because this is the area sampled in most detail.

The Browns Road midden and the Sandstone Point midden complex are extremely important archaeological sites in the near vicinity of Lots 162 & 163 at Beachmere. In isolating these two sites for discussion, the EIS fails to clearly emphasise their complex cultural and environmental context. Both sites suggest occupation by a mostly sedentary population that for c. 2000 years exploited both the estuarine and oceanic food resources of Deception Bay (Nolan, 1986; Hall et al., 1987; Meehan, 1988). It is suggested that Sandstone Point and Browns Road functioned as home base sites (Meehan, 1988) for the resident Aboriginal population of the Deception Bay area.

The Sandstone Point midden complex is located to the north east of Lot 162 & 163 on sand ridges immediately landward of the present coastline. In contrast, the Browns Road midden is situated to the west of Lots 162 & 163 on deposits of the Landsborough Sandstone. Utilisation of these sites may have been a response to seasonal indicators which provided the Aboriginals with a guide to the abundance and availability of regional resources (Draper, 1980), as exemplified elsewhere in Australia by Flood, J. (1980) and Meehan (1982).

Whilst little archaeological investigation has been performed at the Browns Road site, it is acknowledged as a lithological artefact resource (Hall, pers. comm.) The Browns Road site occurs on a geological boundary between the Landsborough Sandstone and Quaternary sand deposits (Qld Govt, 1983). Lenses of consolidated gravels of rounded quartz pebbles are present within the Landsborough Sandstone (Wilmott & Stevens, 1988) and may outcrop near the Browns Road site providing a local source of raw material for artefact manufacture. Shell material obtained within this site suggests a movement of people to and from the coastline (a minimum distance of 2.5km to the southeast) on a
regular basis. This movement is both climatically controlled and driven by a need to replenish stone tools.

**SITE SIGNIFICANCE AND THE REGIONAL ARCHAEOLOGICAL CONTEXT**

In light of this evidence, and the ethno-historical record cited previously, it is possible to argue for the extreme importance of the ‘midden precinct’ within Lots 162 & 163. In the first instance it can be seen as part of a site complex extending along a major SW-NE tending sand ridge (Flood, P., 1981, 1983). Evidence to support this assertion is derived from my own field observations of archaeological sites within the boundaries of both Pioneer Sands and Bribie Industrial Sands (Cotter, 1993, 1994) and see Figures 10.4 to 10.10. In fact, as noted earlier, and detailed in the following section, these sand extraction operations are deriving sands from the northern section of the same ridge system which passes through Lots 162 & 163. Moreover as this sand extraction has resulted in the recent destruction of an archaeological site, a site demonstrated to have more than surficial extant (see Figure 10.11) it is likely that the midden precinct in Zone A is the only remaining midden of a midden complex which extended across this particular sand ridge.

This site complex, rather than providing evidence for long term sedentism provides a record of intermittently used ‘dinnertime camps’ (see Meehan, 1987) associated with the exploitation of nearby swamp resources. This differentiates such sites from both the Sandstone Point and the Browns Road home base sites. If we accept Wallin’s (1994) reliance on Bowdler’s (1984) claim that the significance of a site is a function of its representativeness, it is possible to state that the midden precinct in Lots 162 & 163 is significant because within the Beachmere area there are no other ‘dinnertime camps’ in the preserved archaeological record. Further these ‘dinnertime camps’ have been demonstrated to be a function of the daily social interaction of Aboriginal groups (Meehan, 1988:173). Also, as Meehan (1988) indicates, the dinnertime campsite was not selected at random but influenced by, for example, daily weather conditions, the amount of water nearby and overall aesthetic appeal.

It has been argued that the significance of a site should be determined in light of its regional, environmental context (Hughes & Sullivan, 1984). In addition management decisions should be based on reliable information concerning the immediate setting of sites and their research potential (Sullivan, 1989). For the Beachmere area this entails close scrutiny of the archaeological record. I believe that the approach which maintains that the whole of the regional coastline ‘was one big midden’ (DEH Officer, pers. comm.), and hence well represented by the Sandstone Point midden complex, is both simplistic and inaccurate. An argument well supported by :(a) the distinct location of the ‘midden precinct’ in Lots 162 & 163 on top of the sand ridge, a site specifically chosen; (b) the ethno-historical record which establishes an association with such short term camps and particular mortuary practices observed in the immediate area; and (c) the possibility that the sand ridge in question is likely to have been utilised by Aboriginal groups prior to Sandstone Point. With respect to (c) it is important to realise
that within both the boundaries of the BIS and PIONEER sand extraction operations archaeological material has also been observed at depth (see Figure 10.11) suggesting some longer term use of the area.

**THE LOCAL ARCHAEOLOGICAL RECORD - INTERPRETING ZONE A OF LOTS 162 & 163**

The site interpretation presented by Wallin (1994) is the area of the cultural heritage assessment section of the EIS which is the most questionable. Her interpretation is both ill-informed and inaccurate. The arguments presented below are specifically designed to refute those interpretations which relate to the shell midden and precinct of Zone A.

*Integrity tests clearly demonstrated that this midden has been highly disturbed. The most likely interpretation of this disturbance is that the top, most dense part of the midden has been pushed, probably by a bulldozer, to the south to fill all the swales in the southwestern corner. This would explain why:*

- why no swale and ridge formations exist there, whereas they are apparent over the remaining block.
- why pine trees grew well on the midden ridge, whereas it has been observed elsewhere (M. Strong, 1994, pers. comm) that these trees will not normally grow on particularly dense midden.
- why the southwestern corner has such a significant scatter of shell without any apparent midden depth (Wallin, 1994).

**PINUS ELLIOTTI PLANTATIONS AND ARCHAEOLOGICAL SITE DISTURBANCE**

One of the most astonishing aspects of Wallin’s (1994) assessment of Zone A is her interpretation that the area has been highly disturbed due to the activities associated with the planting and harvesting of a pine plantation across the Zone. This assessment has been made without any attempt to research the particular methods used to develop the pine plantation. In fact no mention is made even of the species of Pinus (*Pinus elliotti* var. *elliotti*) used in the plantation.

**THE HISTORICAL CONTEXT**

It is well documented that exotic pine plantations have been established on the coastal lowlands of Queensland since the mid 1920's (Bevege, 1972; Francis, 1982; Francis & Bacon, 1983; Ryan, 1990). It is also a well known fact that *Pinus elliotti* var. *elliotti*, commonly termed slash pine, was one of the principal pine species planted. In 1964, for example, slash pine made up 1/3 of the total 111,500 acres (45, 141 ha) of softwood plantation established (Bevege, 1972). By 1981, the Queensland Department of Forestry had planted over 84,000 hectares of exotic pines on these lowlands with significant private plantations also being established, notably by A.P.M Forests Ltd. Within southeast Queensland A.P.M. had planted 30,000 hectares of exotic pines by 1981 (Francis, 1982). Further, it is common knowledge that the pine plantations within the Beachmere area were privately developed by A.P.M. in the 1960s and that the pine species planted was slash pine (Macarthur, 1978; Mann, 1990; Hall et al., 1991).
Certain verification of this time period comes as a result of a comparison between the 1958 aerial photograph presented in the EIS which shows the site prior to the establishment of the pine plantation and the 1972 aerial photograph which is clearly post establishment (Figures 10.12 & 10.13).

Within Queensland, early exotic pine plantations were established by hand felling and burning the native forests, a practice followed by hand planting after which no further site preparation occurred (Henry, 1961; Francis, 1982; Francis & Bacon, 1983). These early manually established plantations were confined to low ridge sites defined as plantable from soil-vegetation surveys, thereby by-passing the forty per cent of areas with shallow soils and poorly drained swamps (Francis & Bacon, 1983). Research into site preparation, designed to improve production and allow extension of pine plantations into areas previously unplantable, was not initiated until a rapid expansion in annual plantations occurred within the 1960s (Francis, 1982). Intensive mechanisation of site preparation and planting of pine species was not established until the early 1970s (Francis, 1982); sometime after the establishment of the A.P.M. pine plantations around Beachmere.

Further examination of the 1958 aerial photograph suggests that Lots 162 & 163 were not densely vegetated at this time, with the immediate area being a poorly vegetated sand ridge system. Given an historical context, it seems likely that these Lots would have been selected for pine plantation because major clearing activities could be avoided. Additionally the drainage and relief of the sand ridge would have allowed the placement of this landscape feature in that part of the coastal lowlands defined as plantable (Pegg, 1967; Francis & Bacon, 1983). Thus it is suggested that the A.P.M. pine plantation established at Beachmere required little if any mechanised site preparation.

As Wallin (1994) rightly indicates, the area of Zone A shows some evidence of mechanised preparation, in the form of three north-south aligned windrows. Windrowing as a land preparation technique has one major disadvantage. The bulk removal of residual material and its concentration in windrows may result in a loss of 10% of plantable area and significant site nutrient depletion (Everts, 1981; Leggat, 1981). Thus well designed, purpose built rakes, have long been considered preferable to modified dozer blades for windrowing because they allow disturbance to topsoil be kept to a minimum. (Everts, 1981; Leggat, 1981).

THE BRIBIE ISLAND EVIDENCE

It is important to place the occurrence of windrows on Lots 162 & 163 in the context of the evidence for archaeological site disturbance found on similar sand dominated pine plantations on Bribie Island (Hall et al., 1991). In the Bribie Island Forest Archaeological Project (BIFAP) Report the following conclusions were derived with respect to the impact of pre-pine plantation clearance on archaeological site disturbance:
....the part of Bribie Island's archaeological record which falls within the pine forest is less disturbed and damaged by pre-pine plantation clearance than previously thought. In fact, the native forest clearance appears to have caused only superficial damage. Further this damage has been in the form of site dislocation; surface material has been spread and scattered from its original context largely by the formation of windrows and it has not been extensive. (Hall et al., 1991:27)

Whilst Wallin (1994) acknowledges that the evidence from Bribie Island suggests that pre-pine plantation clearance may only cause surface damage to archaeological sites she suggests that for Zone A of Lot 163 considerable surface disturbance, possibly as a result of bulldozing, has occurred. To support her case, she suggests the occurrence of pine trees established along the major sand ridge in contrast to that commonly observed in the region, reflects this site disturbance. However, research into pine plantations within the coastal lowlands has focused on the reduction of soil nutrient deficiencies (responsible for such plantation diseases as fused needle) which have prevailed in this region (Henry, 1961; Richards, 1958, 1961a,b; Mannion, 1977; Simpson, 1978; Francis, 1984; Francis & Shea, 1987; Flinn & Turner, 1990; Simpson & Grant 1991). On ridge top sites the significant phosphorous deficiency of coastal wallum soils would be exacerbated by porous sandy soils, resulting in a diminished pine establishment. The development of broad scale aerial applications of phosphate in the1970s had allowed pines up to ten years old to be treated for phosphorus deficiencies for the first time (Simpson & Grant, 1991). It is therefore logical to argue that fertilizer application rather than site disturbance is the main cause of the presence of pines along the ridge system within Lots 162 & 163. In light of the information obtained regarding exotic pine plantation establishment in southeast Queensland coupled with the evidence from the BIFAP report, and the following geomorphological interpretation of Zone A, it will be clearly demonstrated that Wallin (1994) has misinterpreted the level of site disturbance and hence the level of ‘integrity’ of the archaeological material in this Zone.

THE GEOMORPHOLOGICAL CONTEXT OF LOTS 162 & 163

The geomorphological interpretation provided below is derived from an extensive survey of sections of the Deception Bay area, conducted by myself and one field assistant, with the purpose of establishing the micro-topography of the region. This information forms an integral part of my research into the geomorphological evolution and past vegetation history of Deception Bay.

The recent removal of pine trees has enabled me to pursue my survey through areas previously difficult to access. One of these areas is the parcel of Land designated as Zone A of Lot 163 by Wallin (1994). This area is of considerable importance to me since the 1991 aerial photograph (Figure 10.14) suggests it to be part of the southern margins of a sand ridge established by Flood, P. (1980, 1981, 1983, 1984) to be about 5,000 years old.

To make an accurate assessment of the sand ridge system clearly displayed on the aerial photograph, a grid survey was adopted. The survey grid (with dimensions 210m north-south by 200m east-west)
was commenced at the south west corner of the pine plantation located at the junction between Peel and Mynott Roads (Grid Reference NR 072032) (Department of Geographic Information, 1988). The grid was marked at 10m intervals using plastic tent pegs. Using a levelling tube (Type Siokrra C40) the elevation of the ground surface at the base of each peg was established for the entire grid. All survey measurements were made with reference to an arbitrary site datum of 3.00 metres assumed for peg A1 situated in the most south west corner of this grid. The results of this survey are presented in Figure 10.15.

The most important result of this survey is that whilst two windrows were detected within the survey boundaries (a further, more easterly windrow was also noted but not included in the survey area), these are superimposed over the pre-existing landscape. Wallin (1994) implies that the non existence of swales in the south west corner of Zone A is an artefact of land modification by the timber industry. It is more appropriately interpreted as an artefact of coastal evolution. A major southwest-northeast tending sand ridge, illustrated in Figure 10.14, is readily identified as a distinct, regional landscape feature. This sand ride developed some 5000 years ago during a period of higher sea level (Flood, P., 1980; 1981; 1983 & 1984). Therefore the immediate eastern flank of this ridge can be considered to have been the edge of an earlier shoreline.

A sea level decline at c. 3000 years ago resulted in the formation of a further dune system adjacent to the present coastline (see Figure 10.14). The landscape between these two dune systems is interpreted to be a sand sheet deposited under marine conditions whilst the sea level existed at the higher still stand (c. 5000 years ago). Aeolian deposition of finer sands overlying these marine sediments by south easterly winds has persisted since the sea level decline at c. 3 000 years ago, resulting in a gentle southerly sloping feature devoid of ridge and swale topography. Support for such conclusions is provided by O'Flynn (1979); from sieve size analyses (O'Flynn, 1980; O'Flynn et al., 1983) and as illustrated on the 1:100 000 Brisbane geological map (Queensland Government 1983) and Figure 10.16. Further support is provided by subsurface sampling from Lots 162 & 163 where marine muds were encountered in the eastern section (Maher & Associates, 1994). This interpretation clearly negates Wallin’s (1994) explanation that the absence of swales in the southern portion of Lots 162 & 163 is evidence of significant site disturbance by mechanised site preparation.

**Preservation of the Melalueca Swamp to the North of Lots 162 & 163**

This *Melalueca quinquenervia* swamp has been the central focus of my research and hence I am well positioned to make comment on it. I certainly concur with Wallin (1994) when she states that it was an area of considerable Aboriginal cultural significance and on this basis should be preserved. I am however of the opinion if this wetland is to be preserved because of its cultural significance than so too should the sites immediately to the east and south of it since they are demonstrably associated with the swamp.
CONCLUDING REMARKS

The Cultural Heritage Assessment section of the EIS entitled Beachmere Sand Extraction, Lots 162 & 163 (Maher & Associates) has failed to adequately address the substantive issues with respect to the unique Aboriginal cultural heritage values of the Beachmere area. The issue of an Aboriginal Community Consultation process which has disenchanted sections of the Aboriginal community destroys the credibility of the EIS document. Similarly the EIS document fails to provide adequate information and/or recommendations regarding the likely event of Aboriginal burials being discovered in the proposed area of sand extraction, and cannot therefore be considered a reliable document. This clearly makes the decision making tasks of all those involved in the assessment of the proposal, and its ultimate approval or disapproval extremely difficult; and open to much criticism.

It must also be acknowledged that the Cultural Heritage Section of the EIS presents an ill-informed and inaccurate assessment of the immediate cultural heritage values of Lots 162 & 163. The interpretation of the nature and extent of archaeological site disturbance in Zone A of Lot 163, as presented in the EIS, has been demonstrated to be based on little historical research and a poor understanding of the local geomorphology. It is this issue of site disturbance which is central to the recommendation in the EIS that a limited excavation and then ultimate removal of Aboriginal cultural heritage items (for their safe keeping on Bribie Island) occur. Since the site interpretation presented in the EIS is so demonstrably inadequate, none of the recommendations in that document which refer to items of Aboriginal cultural heritage of the Beachmere area should be given serious attention.

The ethnohistorical record and the local and regional archaeological record of the Beachmere area demonstrate the unique and immense Aboriginal cultural heritage values of the area, and in particular of those land parcels subject to proposed development for sand extraction purposes. It is for this reason that this report recommends that the permit application for a sand extraction lease lodged by Pumicestone Pacific Resources Trust, not be approved. Also it is recommended that with proper Aboriginal community consultation the Caboolture Shire Council should take action to preserve the midden precinct in Zone A of Lot 163 for the education and benefit of the entire community.
Figure 10.1. Land use patterns for the Ningi Area, Toorbul Peninsula, Deception Bay Southeast Queensland.
1994 Land use patterns for the research study area, Ningi, Deception Bay, South East Queensland.


Figure 10.2. 1994 Land use patterns for the research study area, Ningi, Deception bay southeast Queensland.
Figure 10.3. Land & vegetation profile of the *Melaleuca* wetland located due south of the Toorbul Point Bora Rings, Bestmann Road, Ningi, Southeast Queensland.

Figure 10.4. Buldozed land surface at the north western perimeter of Bribie Industrial sands, November 1993.
Figure 10.5. Artefactual material eroding out of the exposed sands pictured in Figure 10.4.

Figure 10.6. Additional Artefactual material eroding out of the exposed sands depicted in Figure 10.4.
Figure 10.7. Pioneer Sands, Ningi, January 1993. This northeasterly facing photograph depicts an artifact scatter (shell material and charcoal can be seen in the foreground) in close proximity to sand extraction operations.

Figure 10.8. Pioneer Sands, Ningi August 1993. Two westerly facing photographs depicting the same area as Figure 11.5; although it is now completely bulldozed. Note that the surface material has been heaped to one side (visible on the bottom right).
Figure 10.9. Pioneer Sands, Ningi, March 1994. This north easterly facing photograph indicates that further sand removal has occurred since the original bulldozing episode (cf. Figure 11.5). Note that the heaped material from the original bulldozing event is visible to the left hand side of the dirt track, and also note that it is now vegetated with colonizing weed species.

Figure 10.10. This photograph depicts the artefacts found eroding out of the heaped sand piles noted in Figure 11.7.
Figure 10.11. This photograph depicts one face of a test pit associated with the artefact scatter shown in Figures 10.5 to 10.8. Shell material occurs at depth, firmly bound in a baked clay matrix suggestive of an ovenpit.
Figure 10.12. A 1958 aerial photograph of the study area. This photograph clearly indicates that no pine plantations were established on Lots 162 & 163 at this time (cf. Figure 10.13) Aerial Photograph: REDCLIFFE RUN 4 Q769-20, 16.5.1958 Source, Department of Natural Resources, Sunmap Centre, Woollongabba Qld.
Figure 10.13. A 1972 aerial photograph of the study area clearly showing that Lots 162 and 163 are at this time planted to pine. Aerial Photograph: BRISBANE I-IV Run 3 Q2566 1-7-1972. Source, Department of Natural Resources, Sunmap Centre, Woollongabba Qld.
Figure 10.15 The result of a survey of Zone A of Lot 163, Beachmere. Note that the windrows are superimposed on the pre-existing microtopography, and that the midden precinct in part lies on a sand ridge between two windrows.
Figure 10.16. Geological map of the Toorbul Peninsula indicating the presence of marine deposits between parallel dune systems.
CHAPTER 11

CONTEST AND LANDSCAPE II: THE COURT APPEAL

THE PROPOSED BEACHMERE SAND EXTRACTION SITE: A REPORT TO THE QUEENSLAND PLANNING & ENVIRONMENT COURT (WITH REGARD TO ARCHAEOLOGICAL AND CULTURAL HERITAGE ASSESSMENT ISSUES ASSOCIATED WITH APPEAL NO. 221 OF 1995).

Cotter, M.M.

School of Environmental Science and Management, Southern Cross University, Lismore, NSW.

Unpublished report

1995, August. [Report submitted to the Queensland Planning & Environment Court as material to Planning & Environment Appeal No. 221 of 1995 Harrison & Genry vs Caboolture Shire Council & Ors.].

Concept and design of research

Concept & project design: Cotter, M.M.

Collection, analysis and interpretation of data

Collection, analysis and interpretation of data: Cotter, M.M.

Writing

Writing: Cotter, M.M.

Proof reading and edits: Cotter, M.M.

Preparation of tables and graphics: Cotter, M.M. (except where acknowledged in the captions).
CHAPTER 11

CONTEST AND LANDSCAPE II: THE COURT APPEAL

THE PROPOSED BEACHMERE SAND EXTRACTION SITE: A REPORT TO THE QUEENSLAND PLANNING & ENVIRONMENT COURT (WITH REGARD TO ARCHAEOLOGICAL AND CULTURAL HERITAGE ASSESSMENT ISSUES ASSOCIATED WITH APPEAL NO. 221 OF 1995).

REPORT SUMMARY
This report highlights aspects of the scientific, archaeological and cultural heritage importance of the area within and adjoining the proposed Beachmere Sand Extraction operations, as outlined in the Beachmere Sand Extraction Environmental Impact Statement (EIS) (Maher & Associates, 1994). Consideration is given to the historical context of cultural heritage management practices within Queensland as the difficulties and complexities of present cultural management strategies demonstrably have an historical component. The report indicates that the dunal system proposed for Sand Extraction by Pumicestone Pacific Resources and Investment Trust has a high degree of sensitivity with regard to Aboriginal Cultural Heritage Issues. Elements of the ethno-historical record, features of the local and regional archaeological record and aspects of the environmental history are linked to demonstrate that for this dune system:-

1. a “midden precinct” of inherent cultural significance has been located on its surface;
2. the archaeological record has a subsurface component which warrants detailed cultural heritage significance assessment;
3. there is a high likelihood that Aboriginal skeletal remains will be found in this dune system.

In addition, if archaeological features of the Deception Bay area are considered not as single isolated sites but as elements of a cultural landscape which depicts the total “activity area” of a past Aboriginal group then each site has a unique importance which I maintain should be considered in any determination of cultural heritage significance.

INTRODUCTION
This report is written in response to requests by members of the Beachmere Community Association for assistance in identifying cultural heritage issues pertinent to their opposition of the proposed Beachmere Sand Extraction Operation. Likewise members of the Gubbi Gubbi Aboriginal Corporation have asked me to highlight aspects of the local and regional archaeological record of the Beachmere area in order to assist them in maintaining and protecting their cultural heritage within its present physical environment.
The report begins by identifying the historical context of Cultural Management practices within Queensland as these have direct implications for the strategies presently adopted for Cultural Resource Significance Assessments, and consequently it is this historical context which can be seen to have initiated many of the complexities and difficulties present in Cultural heritage management as it pertains to the Beachmere Sand Extraction Proposal. In identifying the concept of ‘cultural landscapes’, the report attempts to highlight its significance as a tool for Cultural Heritage Significance Assessment. The report suggests that any Cultural Heritage Assessment which fails to adequately consider the spatial and temporal context of individual items in the archaeological record, and their relatedness to other items as elements within the ‘action sphere’ of prehistoric peoples, fails to appropriately define its cultural heritage significance. This concept of ‘cultural landscape’ is used as a focus for the synthesis of aspects of the local and regional archaeological record, the ethnographic record and the environmental history within the Beachmere area especially where these are considered to highlight the immense Cultural Heritage Significance of the land parcel presently the subject of this Court Appeal.

CULTURAL MANAGEMENT ISSUES

Bob Ellis, Senior Conservation Officer (Anthropology) Cultural Heritage Branch of the Queensland Department of Environment and Heritage, writing in a personal capacity, recently characterised the historical development of cultural heritage management in Queensland (Ellis, 1994). In doing so he has succinctly highlighted the difficulties and complexities of current cultural heritage management practices within Queensland, practices which in the context of the Beachmere Sand Extraction Proposal have thus far failed to allow for the adequate assessment of the cultural heritage significance of both the distinct “midden precinct” within Zone A of Lot 163 (Wallin, 1994) and of the more extensive sand ridge system upon which this precinct is situated.

Ellis (1994) noted that during the 1970’s archaeologists were far more concerned with establishing models for the understanding of the prehistory of Queensland, rather than with the interpretation of cultural landscape values, or cultural amenity, for protection and management purposes. Cultural heritage management was influenced by these archaeological preoccupations to the extent that site recording methods were developed within an archaeological rather than a cultural heritage framework.

As a consequence cultural heritage data was referenced by single-point grid references and the resultant “Dot Maps” were maintained although no useful information with regard to site management or protection was provided by such a recording system. Typically ethnographic or human information was insufficiently recorded, strategic cultural information was not available for planning and site types (for example artefact scatters and bora grounds) were similarly ranked despite obvious differences in their form and function. For Ellis (1994) the worst feature of this recording strategy resulted from the fact that various elements which together constituted the cultural unity of places of community
importance were fragmented into separate archaeological dot recordings depicting separate isolated ‘sites’ (Ellis, 1994: 17) (my emphasis).

In the context of the Beachmere Sand Extraction proposal it is significant that Ellis (1994) claims that the consequences of this cultural heritage ‘management’ strategy are “becoming increasingly apparent as new land use issues and urban expansion threaten areas that were previously considered remote.” The following comments made by Ellis (1994) serve to clearly illustrate the difficulties faced by present cultural resource managers in their efforts to offer some protection for sites; and points towards an explanation for the recent inadequacy of the Cultural heritage assessment of the Beachmere sand extraction proposal.

In a desperate but futile response, archaeological consultants are still engaged by their colleagues to write further reports recommending “action” and recording further ‘data’. These reports continue to follow formats and models which, in large part, had caused the initial difficulties. Managers struggling to achieve protection for places which may have been recorded by archaeologists ten years earlier, face repeated frustration and developer hostility as they negotiate to represent Aboriginal community interests or to integrate features not previously considered relevant or even part of the cultural landscape, into the concept of ‘site’ (Ellis, 1994:17).

This notion of ‘cultural landscape’ and more particularly the notion of ‘landscape’ is a recent concept within Australian archaeological theory and as such has provided new research ideas and methods for interpretation of the archaeological record. Gosden & Head (1994) describe the fundamentals of the concept of “landscape” for the archaeologist in the following terms.

Landscapes are both created and creating. Landscapes are shaped by human action through processes such as clearance, erosion and deposition; they are also the shapers of human action encouraging and constraining various forms of landuse and inter-regional connection (Gosden & Head, 1994:114).

The notion of ‘cultural landscape’ as described above has significant implications for the accurate assessment of the Cultural heritage values of the proposed Beachmere sand Extraction Site. As will be demonstrated in the following sections the ‘midden precinct’ in Zone A of Lot 163, if separated from other sites in the region, cannot be accurately assessed for its Cultural heritage significance. Importantly the Australia ICOMOS charter for the conservation of places of cultural significance (The Burra Charter), considers cultural significance to mean ‘aesthetic, historic, scientific or social value for past, present and future generations’ (Marquis-Kyle & Walker, 1992). I would maintain that it is difficult to accurately assess the past importance of a site if no attempt is given to detailing its spatial and temporal links with other sites. Similarly the present archaeological, scientific and social significance of a site should not merely relate to its similarity (or difference) to other sites but rather should be considered in light of its interconnectedness to other sites; and to its inherent ability to represent the past, present and future social and cultural landscapes of the peoples whose heritage it is.
THE REGIONAL ARCHAEOLOGICAL CONTEXT

Prior to the initiation of The Moreton Region Archaeological Project (MRAP) in 1977 by Dr Jay Hall of the University of Queensland (Hall, 1980; Hall & Hiscock, 1988), no systematic archaeological investigation had been conducted within this part of the Moreton region, although an archaeological survey and excavation had been conducted at Sandstone Point by Laila Haglund between 1970 to 1972 (Hall et al., 1987).

MRAP commenced some years after the introduction of exotic pine plantations to the Deception Bay area. The first implication of this fact being that no substantial archaeological survey had been conducted before pine plantations were established in the Beachmere area. Even with the systematic archaeological investigations advocated in MRAP, the extent of land surface covered by these plantations would have considerably reduced both the accessibility and the visibility of archaeological sites within the area (cf. Hall et al., 1991). Moreover these plantations were established well before land developers were required to assess the environmental impacts of their proposed developments. In this way private land development was (or could be) achieved without due consideration for the archaeological record.

It is known that two systematic surveys have been conducted in regions planted to exotic pines on Bribie Island, under the supervision of Dr Jay Hall (Hall et al., 1991). To my knowledge no such systematic survey has been conducted throughout the Beachmere region. As Ellis (1994) has commented this lack of systematic survey makes management and assessment of archaeological sites difficult and indeed any Cultural heritage significance assessment of the Deception Bay area based on a relative comparison to Bribie Island would be subject to inaccuracies based on unequal surveys.

However if the notion of ‘cultural landscapes’ is considered with particular reference to the archaeological and ethnographical record of the Deception Bay area than it can be clearly demonstrated that the area is of distinct cultural significance. One of the most well recognised features of the archaeological record of the Deception Bay area is the ceremonial ground referred to as the Toorbul Point Bora Rings situated on the crest of a sandstone ridge along Bestman Road, Ningi. This ground is located 2 km north of the area proposed for sand extraction and, in common with other of these grounds, can be considered to have been the focal area for a number of social, economic and political aspects of the lifestyle of the prehistoric inhabitants of the area (Satterthwait & Heather, 1987).

In addition to this ceremonial site, the Browns Road midden and the Sandstone Point midden complex are archaeological sites in the near vicinity of Lots 162 & 163 at Beachmere. These sites provide insight into the nature of the ‘cultural landscape’ of the individual inhabitants of the area whose activities produced the noted archaeological record. Both sites suggest occupation by a mostly
sedentary population that for c. 2000 years exploited both the estuarine and oceanic food resources of Deception Bay (Nolan, 1986; Hall, et al., 1987; Meehan, 1988). It is suggested that Sandstone Point and Browns Road functioned as home base sites (cf. Meehan, 1988) for the resident Aboriginal population of the Deception Bay area.

The Sandstone Point midden complex is located to the north east of Lot 162 & 163 on sand ridges immediately landward of the present coastline. In contrast, the Brown's Road midden is situated to the west of Lots 162 & 163 on deposits of the Landsborough Sandstone. Utilisation of these sites may have been a response to seasonal indicators which provided the Aboriginals with a guide to the abundance and availability of regional resources (Draper, 1980), as exemplified elsewhere in Australia by Flood, J. (1980) and Meehan (1982).

Whilst little archaeological investigation has been performed at the Browns Road site, it is acknowledged as a lithological artefact resource (Hall, pers. comm.) The Browns Road site occurs on a geological boundary between the Landsborough Sandstone and Quaternary sand deposits (Qld Govt, 1983). Lenses of consolidated gravels of rounded quartz pebbles are present within the Landsborough Sandstone (Willmot & Stevens, 1988) and may outcrop near the Browns Road site providing a local source of raw material for artefact manufacture. Shell material obtained within this site suggests a movement of people to and from the coastline (a minimum distance of 2.5km to the southeast) on a regular basis. This movement would have been both climatically controlled and driven by a need to replenish stone resources.

ELEMENTS OF THE ETHNO-HISTORICAL RECORD

Steele (1984) writes that an Aboriginal clan migrated frequently between their headquarters at Ningi Ningi (Toorbul Point) and Redcliffe. He also makes comment on the visit to Toorbul Point by the Reverend Christopher Eipper between 2 and 13th August 1841 which was published in the Colonial Observer 14 and 21st October 1841 (Steele, 1984). In the context of the Beachmere area Steele's commentary is significant because he clearly indicates that the area was part of the central pathway used by the Ningi Ningi clan for their travels from Redcliffe to Toorbul Point,

Next day the missionaries crossed the North Pine River, and in the afternoon they had a view of the Bay, 'and to the right the path to Umpie Bong or Old Settlement was pointed out; but as there was no smoke visible, our guides concluded that the natives of that place had gone to Toorbul, which is the native name for Ninga Ninga'. The missionaries crossed Burpengary Creek and the 'Kaboltur' river camping on the banks of the latter.

They next travelled along the sandy beach of Deception Bay, then turned inland and crossed a 'very disagreeable swamp well nigh a mile long' in which women were digging dangum (fern-root, known at Toorbul Point as Bungwall). At the Toorbul Point camp, women were seen returning with oysters gathered from islands in Pumicestone Passage. After much pounding
of dangum, both dangum and oysters were roasted for the evening meal (Steele, 1984:166).

From this description it is possible to assert that the ‘most disagreeable swamp’ which Eipper encountered and the Ningi Ningi clearly passed through and utilised, is the large *Melaleuca quinquenervia* wetland located due south of the Toorbul Point Bora ground at Bestman road, Ningi (Figure 11.1). A field survey of this wetland conducted during 1993 & 1994 has established the present length of this wetland area to be 1.8 km and for much of its length *Blechnum indicum* (Bungwall), a noted food staple of the Aborigines, dominates the understorey.

This wetland does not have a uniform topography, it is dissected in parts with southeast draining channels, and a predominate sand ridge forms a high point within the area. A single artefact and a sparse scatter of shell material have been noted on top of this sand ridge. It is therefore likely that high points within the wetland enabled it to be trafficked by Aboriginal groups, and that they have done so in the past is evidenced by artefactual material observed within the swamp.

Similarly Uniake (cited in Steele, 1972) presents details of a fight among the natives of Moreton Bay, witnessed by John Finnegan in November 1823. This fight occurred at a ceremonial ground within the tribal lands of a clan ‘five and twenty miles’ to the southwest of the natives at Pumicestone River (situated at Toorbul), which can be interpreted to be at least in the vicinity of the Redcliffe Bora Ground (Steele, 1972). Finnegan's account of the death of two of the Pumicestone River clan during this fight is significant to the Beachmere area because it clearly associates the area with Aboriginal mortuary practices:

> Just before dark I saw a large crowd approach, who (it seems) were bringing the bodies of the two men who had been killed. They laid them down ...and began a great lamentation over them. The first body was completely flayed, but they had not yet had leisure to skin the other. Two large fires were lighted where the bodies lay, in which, as I judged from the noise, as well as the offensive smell, they were both consumed. Immediately after this our whole party decamped; and having travelled more than half a mile, we stopped for the night. Very early next morning we again started, and travelled all day with great expedition, without ever halting or eating anything I had observed, during this day's march, two men, each of whom carried something on his shoulder, but did not keep the same path with us, walking through the bush at a little distance abreast of us. We travelled that day about eight or ten miles, and toward evening arrived at the edge of a large swamp, where we halted, and huts were instantly erected by the women, who were afterwards obliged to go out and procure fern-root for the whole party. I lodged as usual with the chief, at a little distance from whose hut I observed the two men hang up their burthenrs (Finnegan cited in Steele, 1972:77-83).

Before continuing with this narrative, it is important to note that Finnegan's placement of this swamp some ten and one half miles (approximately) from the visiting party's camp at the Redcliffe Bora Ring suggests that the swamp is also the wetland area due south of the Toorbul Point Bora Ring. This interpretation is based on the expectation that the Pumicestone River clan, mourning the death of two
of their party, did not walk south or west into the area of the clan whom they had been in battle with, but that they retreated north towards Toorbul. Lending support to this evidence are personal observations of midden material located on the sand dunes immediately to the east and southeast of this wetland area. Furthermore, the archaeological site identified by Wallin (1994) in Zone A of Lot 163 is in fact situated on the most immediate and most substantial dune to the southeast of the wetland area. It should also be stated that the "expeditious" nature of the grieving Aboriginal party's trip to the wetland campsite suggests that it was a purposeful journey, ie it was the specific intention of the group to arrive at the wetland campsite in order to complete their mortuary rituals.

Finnegan (cited in Steele, 1972: 82) goes on to state that the party camped beside this swamp for two days during which time a fire was kept burning underneath the site where the two "burthers" had been hung. Against the wishes of members of the Pumicestone River clan Finnegan persisted until he had ascertained that the burthers were in fact the skins of the two men who had been killed. On the evening of the second day at this campsite Finnegan witnessed what were clearly the final funeral rights of the two deceased.

Shortly afterwards, all the men dressed themselves in kangaroo skins, and one of them in an old rug jacket which I had, and with one or two women, held a consultation round the fire, each person having a fire-stick in his hand. After conversing about half an hour, two of the party separated from the rest, and having taken down the skins, set off at full speed through the bush; the rest followed, shouting and making much noise. After this I saw nothing more of the skins, nor do I know what became of them. In about three-quarters of an hour the party returned. The next morning we returned to the Pumicestone River and the natives followed their usual occupations, as if nothing had happened (Finnegan cited in Steele, 1972:77-83).

The final point to be made with regard to Finnegan's observation is that the mortuary practices surrounding this incident cannot only be determined to have occurred within the immediate locale of Beachmere, the actual site of final placement of the skins of the deceased, within the landscape, must have occurred within a short distance of the described campsite. Thus the area has been historically documented to have been of immense Aboriginal cultural significance. Moreover there is apparent in Finnegan’s description of the movement of the Ningi Ningi clan throughout Deception Bay, the clear indication that they functioned within a ‘cultural landscape’. The notion of the Ningi Ningi clan following pathways suggests a conceptualisation of the interrelationships between and within sites by this clan. This therefore suggests that sites within Deception Bay have significance as unique components of the ‘cultural landscape’ of Deception Bay. Thus to isolate these unique components of the ‘cultural landscape’ by referring to them as individual ‘sites’ reduces the accuracy of any assessment of their cultural significance.
Figure 11.1. Location of proposed sand extraction site.
SITE SIGNIFICANCE & THE REGIONAL ARCHAEOLOGICAL CONTEXT

In light of the regional archaeological record and the above ethno-historical accounts, it is possible to argue for the extreme importance of the "midden precinct" within Lots 162 & 163. In the first instance it can be seen as part of a site complex extending along a major SW-NE tending sand ridge (Flood, P. 1981, 1983; Siemon, 1994). Evidence to support this assertion is derived from my own field observations of archaeological sites within the boundaries of both Pioneer Sands and Bribie Industrial Sands (Cotter, 1993, 1994) and see Figures 11.2 to 11.8. In fact, these sand extraction operations are deriving sands from the northern section of the same ridge system which passes through Lots 162 & 163. Moreover as this sand extraction has resulted in the recent destruction of an archaeological site, a site demonstrated to have more than surficial extant (see Figure 11.9) it is likely that the midden precinct in Zone A is the only remaining midden of a midden complex which extended across this particular sand ridge.

Figure 11.2. Bulldozed land surface at the north western perimeter of Bribie Industrial Sands, November 1993.
Figure 11.3. Artefactual material found eroding out of the exposed sands featured in Figure 11.2.

Figure 11.4. Additional artefactual material found eroding out of the exposed sands featured in Figure 11.2, Bribie Industrial Sands, November 1993.
Figure 11.5. Pioneer Sands, Ningi, January 1993. This northeasterly facing photograph depicts an artefact scatter (shell material and charcoal can be seen in the foreground) in close proximity to sand extraction operations.

Figure 11.6. Pioneer Sands, Ningi, August 1993. Two westerly facing photographs depicting the same area as Figure 11.5; although it is now completely bulldozed. Note that the surface material has been heaped to one side (visible on the bottom right).
Figure 11.7. Pioneer Sands, Ningi, March 1994. This north easterly facing photograph indicates that further sand removal has occurred since the original bulldozing episode (cf. Figure 11.5). Note that the heaped material from the original bulldozing event is visible to the left hand side of the dirt track, and also note that it is now vegetated with colonising weed species.

Figure 11.8. This photograph depicts the artefacts found eroding out of the heaped sand piles noted in Figure 11.7.
Figure 11.9. This photograph depicts one face of a test pit associated with the artefact scatter shown in Figures 11.5 to 11.8. Shell material occurs at depth, firmly bound in a baked clay matrix suggestive of an ovenpit.
This site complex, rather than providing evidence for long term sedentism provides a record of intermittently used ‘dinnertime camps’ (see Meehan, 1988) associated with the exploitation of nearby swamp resources. This differentiates such sites from both the Sandstone Point and the Brown's Road home base sites. If we accept Bowdler's (1984) claim that the significance of a site is a function of its representativeness, it is possible to state that the midden precinct in Lots 162 & 163 is significant because within the Beachmere area there are no other ‘dinnertime camps’ in the preserved archaeological record. Further these ‘dinnertime camps’ have been demonstrated to be a function of the daily social interaction of Aboriginal groups (Meehan, 1988: 173). Also, as Meehan (1988) indicates, the dinnertime campsite was not selected at random but influenced by, for example, daily weather conditions, the amount of water nearby and overall aesthetic appeal.

It has been argued that the significance of a site should be determined in light of its regional, environmental context (Hughes & Sullivan, 1984). In addition management decisions should be based on reliable information concerning the immediate setting of sites and their research potential (Sullivan, 1989). I would suggest that the following three contextual features of the “midden precinct” highlight its extreme cultural significance:

• it has a distinct location, on top of the sand ridge, suggesting it was a site specifically chosen;
• the ethno-historical record establishes an association with such short term camps and particular mortuary practices observed in the immediate area; and
• personal observations of disturbed sections of the same sand ridge (see Figures 11.2-11.5 and 11.9) have indicated a subsurface component to the archaeological record and hence suggest the possibility that this ridge was utilised by Aboriginal people prior to the establishment of the more seaward Sandstone Point midden complex.

Additionally, as elsewhere emphasised, this ‘midden precinct’ has an inherent cultural significance if it is thoroughly considered as one element of a more encompassing and interlinked prehistoric cultural landscape. In fact this notion of cultural landscape increases rather than diminishes the scientific and archaeological research potential of the site and thereby enhances its cultural significance.

THE LOCAL ARCHAEOLOGICAL RECORD - INTERPRETING ZONE A OF LOTS 162 & 163

The site interpretation by Wallin (1994) is the area of the Cultural heritage Assessment Section of the EIS that is most questionable. The arguments presented below are specifically designed to refute those interpretations which relate to the shell midden and precinct of Zone A of Lots 162 & 163.

Integrity tests clearly demonstrated that this midden has been highly disturbed. The most likely interpretation of this disturbance is that the top, most dense part of the midden has been pushed, probably by a bulldozer, to the south to fill all the swales in the southwestern corner. This would explain why:
- why no swale and ridge formations exist there, whereas they are apparent over the remaining block.
- why pine trees grew well on the midden ridge, whereas it has been observed elsewhere (M.Strong 1994, pers comm) that these trees will not normally grow on particularly dense midden.
- why the southwestern corner has such a significant scatter of shell without any apparent midden depth (Wallin, 1994).

**PINUS ELLIOTTII PLANTATIONS AND ARCHAEOLOGICAL SITE DISTURBANCE**

In the original EIS the ‘midden precinct’ is described as having been highly disturbed due to the activities associated with the planting and harvesting of a pine plantation across the Zone. However, as will be demonstrated below, if the pine plantation is considered in light of its historical context this interpretation cannot be substantiated.

It is well documented that exotic pine plantations have been established on the coastal lowlands of Queensland since the mid 1920's (Bevege, 1972; Francis, 1982; Francis & Bacon, 1983; Ryan, 1990). It is also common knowledge that the pine plantations within the Beachmere area were privately developed by A.P.M. in the 1960s and that the pine species planted was slash pine (Macarthur, 1978; Mann, 1990; Hall *et al*., 1991).

Within Queensland, early exotic pine plantations were established by hand felling and burning the native forests, a practice followed by hand planting after which no further site preparation occurred (Henry, 1961; Francis, 1982; Francis & Bacon, 1983). These early manually established plantations were confined to low ridge sites defined as plantable from soil-vegetation surveys, thereby by-passing the forty percent of areas with shallow soils and poorly drained swamps (Francis & Bacon, 1983). Research into site preparation, designed to improve production and allow extension of pine plantations into areas previously unplantable, was not initiated until a rapid expansion in annual plantations occurred within the 1960s (Francis, 1982). Intensive mechanisation of site preparation and planting of pine species was not established until the early 1970s (Francis, 1982); sometime after the establishment of the A.P.M. pine plantations around Beachmere.

Given an historical context, it seems likely that Lots 162 & 163 were selected for pine plantation because major clearing activities could be avoided. Additionally the drainage and relief of the sand ridge system within these Lots suggests that the area formed part of the coastal lowlands defined as plantable (Pegg, 1967; Francis & Bacon, 1983). It can therefore be suggested that the A.P.M. pine plantations established at Beachmere were established with little if any mechanised site preparation.

Nevertheless the area of Zone A shows some evidence of mechanised preparation, in the form of three north-south aligned windrows. However it is not necessary to use Bulldozing equipment to produce these windrows. In fact well designed, purpose built rakes, have long been considered preferable to
modified dozer blades for windrowing because they allow disturbance to topsoil to be kept to a minimum. (Everts, 1981; Leggat, 1981).

THE BRIBIE ISLAND EVIDENCE
It is important to place the occurrence of windrows on Lots 162 & 163 in the context of the evidence for archaeological site disturbance found on similar sand dominated pine plantations on Bribie Island (Hall et al., 1991). In the Bribie Island Forest Archaeological Project (BIFAP) report (Hall et al., 1991) the following conclusions were derived with respect to the impact of pre-pine plantation clearance on archaeological site disturbance:

*The part of Bribie Island's archaeological record which falls within the pine forest is less disturbed and damaged by pre-pine plantation clearance than previously thought. In fact, the native forest clearance appears to have caused only superficial damage. Further this damage has been in the form of site dislocation; surface material has been spread and scattered from its original context largely by the formation of windrows and it has not been extensive (Hall et al., 1991: 27).*

The evidence from Bribie Island suggests that pre-pine plantation clearance may only cause surface damage to archaeological sites. Similarly observations made of the modern machinery and procedures used for harvesting Pine Plantations lead the senior author of the BIFAP report to conclude that the level of disturbance at felling was less than that which occurred at the initial clearing of native vegetation, particularly if the stumps of felled trees were not removed, as is the case in the area surrounding the “midden precinct” within Zone A of Lot 163.

With respect to the above information regarding exotic pine plantation establishment in southeast Queensland, the evidence from the BIFAP report, and the following geomorphological interpretation of Zone A, it is indicated that the initial Cultural Heritage Assessment of the ‘midden precinct’ within Zone A of Lot 163 misinterpreted the level of site disturbance and hence the level of ‘integrity’ of the archaeological material in this Zone.

THE GEOMORPHOLOGICAL CONTEXT OF Lots 162 & 163
Flood (1980, 1981) proposed a late Holocene coastal evolution model for Deception Bay based on radiocarbon age determinations of estuarine molluscan shells located *in situ* at the base of several dunes within the immediate vicinity of Beachmere. The sequence of events proposed by Flood (1981) was that sea level was at or above its present level about 6000 years ago, at 4700 years ago it was 0.7m higher than present and at 3300 years ago it was still at a level 0.4m higher then present.

Flood (1981) obtained radiocarbon dates from estuarine molluscs located 2.5m below the surface of the same sand ridge that passes through Lots 162 & 163, although his sample site was southwest, in the vicinity of Wallace Road(see Figure 11.1). From this investigation he determined that shallow
water estuarine muds and silts were being deposited at elevations up to 0.7m above present sea level between 4700 years and 5600 years ago. Siemon (1994), in his drilling operations, identified a similar unit within the eastern portion of Lot 162. This unit has also been located by the author in core samples obtained from Wallace Road and from Bayside Drive Lagoon. The shell material has been forwarded for radiocarbon dating to determine whether these facies are temporally comparable to Flood’s data, and thereby supportive of his model for a regional higher sea level at about 4700 years ago.

To date evidence for this higher sea level has been derived from palaeobotanical data obtained, for my research purposes, from sediments within test pits excavated as part of the Bribie Industrial Sands operation. Two pits have been investigated in detail, TP1 and TP17. The two mangrove pollen types identified (namely *Avicennia* and *Aegiceras*) are presently noted to co-exist within the Pumicestone Passage (Batianoff & Elsol, 1989) and therefore it can be suggested that similar climatic and hydrological conditions to those supporting their occurrence in the Pumicestone Passage prevailed, at this more landward location, in the past. Since the reduced levels at both pits are 2.55 and 2.59m respectively, sea-level would need to be 1m higher to permit the noted deposition of the mangrove pollen at 30cm below the present surface. Accelerator Mass Spectrometry (AMS) dating of organic material from TP1 from a depth of 1.14m produced an age of 5800 ± 50 years and at a depth of 1.04m produced an age of 4610 ± 50 years placing this higher sea level within the time frame suggested by Flood (1981). Further confirmation of the ages of some of the ridge systems in the region will be possible as soon as samples submitted for Thermoluminescence dating have been processed (end of September 1995). These results are expected to allow a conclusive model for the evolution of northern Deception Bay to be outlined. Until these dates are available the discussion below is conditional.

Progradation of the coastline is considered to have occurred rapidly in response to a sea level decline to c. 0.4m above present sea level at 3300 years ago. This stillstand is therefore considered responsible for the formation of the major ridge system located parallel but approximately 1km inland of the present coastline. This transverse foredunal feature identified from aerial photography and detailed in the contour plan produced by QASCO survey (Siemon, 1994) trends northeast from the southwest corner of Lot 163 and it is the ridge upon which the “middlen precinct” is located. Associated with this ridge are several smaller, less well defined transverse ridges which complete a characteristic ridge and swale system. The prominence of this ridge system within Zone A of Lot 163 despite the planting and harvesting of pine trees indicates that these activities have caused minimal disturbance to the dune.

During this episode of progradation it is assumed that a similar interaction between riverine and tidal sediments fluxes, as is presently observed at Beachmere occurred to produce a series of sand waves along the tidal sand flats (cf. Flood, 1980). Further shoreline progradation is apparent from the rapid migration seaward of the coastline to its present position. at rates of between 500m to 1km per 1000
years (Flood 1980). Whilst a single age of 1460 years has been quoted for the immediate foredune of the present coastline (Maher & Associates, 1994), the original investigator responsible for the age determination is sceptical of the antiquity and suggests the possibility of the shell fragments belonging to an older dune system that has been reworked during a storm event (Flood, 1981).

In response to the shoreline migrating to its present level, aeolian (or wind transported) sands have accumulated over the earlier dunes obscuring much of the microtopography. Siemon (1994) identifies foundry sand (sand with > 90% of the sample finer that 425μm in size) as existing within the top 1-2m along the crest of the ridge passing through Lots 163 and 162. Additionally, log descriptions for several of the locations state that the sands are rounded, a characteristic of aeolian transport. Similar fine sands have been recorded by me from the top 1.5m of the sandridge at Wallace Road. Also artefactual material observed eroding out of a drainage channel at Bribie Industrial Sands plus those artefact unearthed by bulldozing in this same area (see Figures 11.2 to 11.5) suggests that cultural heritage items are situated within the subsurface of this ridge system as a result of being overlain by aeolian sands.

**ABORIGINAL BURIAL SITES**

In addition to the clearly observable features of the archaeological record within the area proposed for sand extraction, a further potential subsurface component must be considered; Aboriginal burial sites are highly likely to have occurred within this dunal system. This argument can be substantiated by a number of lines of evidence. One of the simplest reasons for this assertion being that, as Meehan (1971) has indicated, sandy coastal areas were often sites for burial because of the ease with which sands could be dug to dispose of the bodies. Likewise, as Finnegan’s account highlights, there is ethnographic evidence to support the notion that mortuary practices occurred in the area. Whilst some of the historically documented evidence suggests that burials were not performed in the area (Petrie, 1992), such evidence in fact is highly variable (*cf.* Petrie, 1992, Welsby, 1967 & Simpson, 1843 cited in Langevad, 1979) and there is held in the Queensland Museum archaeological evidence from the nearby Woodford area to indicate that burials did in fact occur within the region (Meehan, 1971). Also, McNiven (1991) reported the discovery of two burials within sand dune deposits of the Coolum region, a region like Deception Bay documented to be Kabi territory (Steele, 1984) and thus one would suspect that similar mortuary practices persisted throughout the Kabi Territory. In fact Haglund (1976) in her book on the burial site discovered at Broadbeach considers the archaeological and ethnographic evidence for burials within Southeast Queensland and states the following:

*All over this area, from the Wide Bay and Burnett districts down to the Clarence River in northern NSW there was then at the time of European arrival, a great similarity in burial customs. This is the area from which Aborigines came together in the Bunya mountains for the well-known bunya feast and one could expect that such frequent social intercourse which also involved some intermarriage, would lead to a certain homogeneity in ideas and traditions* (Haglund, 1976) (emphasis added).
Indeed the dune system at Beachmere lies in close proximity to the extensive camping site situated at Sandstone Point, the plentiful resources of both Deception Bay and the Melaleuca swamp to the northwest and to the ceremonially significant Toorbul Point Bora Rings, situated at Bestman Road, Ningi. It can be surmised that the Deception Bay area was a focus for group interaction and hence the transference of ideas and customs, customs which have been demonstrated to include burials.

To my knowledge no human skeletal remains have been yet detected within the sand dune system subject to sand extraction at Beachmere. However it would be careless practice, in light of the evidence from Cooloola, not to have a mechanism in place in which the discovery of skeletal remains during sand extraction could be monitored. This, by necessity, would require the formulation of a mitigative plan whereby the cessation of sand extraction, Aboriginal community consultation and assessment by State Government archaeologists occurred immediately upon discovery of such remains. Certainly the recent Sand Fly Creek controversy near Townsville, where the issues of sand mining and the discovery of Aboriginal burial sites have proven difficult to resolve, highlight the fact that such monitoring and mitigative strategies should be an integral part of any sand extraction application. The discovery of Aboriginal burials invites the possibility of protracted negotiations, permanent cessation of mining activities and or prolonged delays in mining, and therefore must be an issue of concern not only to the Aboriginal community involved but it must also present potential economic problems for the developers concerned.

**Preservation of the Melaleuca Swamp to the North of Lots 162 & 163**

The *Melaleuca quinquenervia* swamp to the north of the proposed sand extraction operation can also be demonstrated to be of considerable Aboriginal cultural significance. The basis for this significance is its resource exploitation capacity, since the root of the staple ‘bungwall’ fern was obtainable from this swamp. Similarly as the ethnographic accounts have indicated it was a landmark which the Ningi Ningi identified within their ‘cultural landscape’ and through which they traversed. However, whilst there have been recommendations to preserve this swamp on the basis of its cultural significance I am concerned that no management strategies have been emplaced to deal with elements of hydrological and vegetational disturbance that I have noted in this swamp. In particular drainage ditches from existing sand extraction operations on the eastern perimeter of the swamp flow into this swamp and must therefore at times alter the watertable; and since acid trending soils have been identified within the boundaries of these extraction operations, potentially acidic waters may drain into the swamp (Sutherland & Amaral, 1994). In addition the more recent construction of a drainage system from a residential housing estate situated to the north of the swamp has resulted in the raising of the water table in this area and the general invasion of weed species into the swamp. The major concern here is that the predominant vegetation type within the swamp is *Melaleuca* and it is not considered tolerant of permanent inundation. If these man-made drainage features cause the watertable to be permanently raised then it is likely that the floristic composition of the swamp will be altered to the extent that the
presently significant Melaleuca wetland environment complete with noted cultural heritage values will cease to exist.

**CONCLUDING REMARKS**

In this report I have attempted to highlight the fact that the area which is the subject of this legal dispute is of considerable, archaeological and cultural heritage significance. Elements of the ethno-historical record, features of the local and regional archaeological record and aspects of the environmental history of the area have been used to highlight the fact that past Aboriginals occupied the Deception Bay area. These Aboriginals functioned within a complex ‘cultural landscape’ which had as its component elements, resource exploitation sites, (for example estuarine mudflats and the *Melaleuca* swamp), ceremonial grounds (The Toorbul Point Bora Ground), camp sites such as Sandstone Point and “dinner-time” camps as probably represented by the “midden precinct” within Zone A of Lot 163. In addition this report has emphasised the fact that there is a high likelihood that Aboriginal skeletal remains will be found within the sand dune system of the subject area.

I have argued that the original EIS presented to the Caboolture Shire Council by Maher & Associates (1994) inadequately addressed the cultural significance of the area subject to the sand extraction proposal and I have suggested that part of the present difficulties in regard to cultural heritage management result from an historical perspective which developed a “dot on map” recording strategy which failed to allow for assessment of those interrelated landscape features which formed the ‘cultural landscape’ of past human groups. I conclude by suggesting that in fact the salvage strategy presented in the original EIS derives from an adoption of this historical approach. The site is isolated from its ‘cultural landscape’ and considered as insignificant in light of surrounding sites and the level of disturbance purported to have resulted from the planting and harvesting of pine plantations. I have argued that the level of disturbance in the ‘midden precinct’ is in fact misinterpreted and I believe that the site placed in its correct context is highly significant.
CHAPTER 12

CONTEST AND LANDSCAPE III: AN ANALYSIS

COGNITIVE OWNERSHIP OF HERITAGE PLACES: SOCIAL CONSTRUCTION AND CULTURAL HERITAGE MANAGEMENT.

Boyd, W.E., Cotter, M.M., O’Connor, W. & Sattler, D.
School of Environmental Science and Management, Southern Cross University, Lismore, NSW.

Published paper

1996, Tempus, 6: 123-140.

Concept and design of research

Concept: Cotter

Project Design: Cotter

Project Supervision: Boyd

Collection, analysis and interpretation of data

Collection of data: Cotter

Analysis and interpretation of data: Cotter

Writing

Writing: Cotter

Proof reading and edits: Cotter 50%, Boyd 50%

Preparation of Tables and Graphics: Cotter (except where acknowledged in the captions)
CHAPTER 12

CONTEST AND LANDSCAPE III: AN ANALYSIS

COGNITIVE OWNERSHIP OF HERITAGE PLACES: SOCIAL CONSTRUCTION AND CULTURAL HERITAGE MANAGEMENT.

ABSTRACT

Cultural heritage management has traditionally used the individual site as the focus of administrative and legislative attention. However, two trends indicate that the site focus is becoming inappropriate in managing cultural heritage. In archaeology, concepts of cultural landscape emphasise the interrelationships rather than individuality, and the importance of landscape within any understanding of human behaviour. At a social level, increasing awareness and vocalisation of indigenous claims to land draws attention to the complexity of interest in sites. These trends merge to draw attention to the importance of a modern social landscape characterised by a diversity of cultural interest in places and a complex overlap of social constructions of each site. The recognition of modern social landscapes has important implications for cultural heritage management, since heritage sites sit within these landscapes. Social construction theory provides an analytical tool within which to tackle the complexities of multiple meanings inherent in social landscapes, with the managerial advantage of dealing with the realities rather than the validities of multiple meanings. In this paper, the modern social landscapes are described for two historical sites and two Aboriginal sites. At each site, several interested parties are identified, each with a characteristic claim of association with, or cognitive ownership of, the site. Each party constructs its own meaning, defining the site within a particular social, cultural, economic, political or physical landscape. Identification of the individual meanings and landscapes, and the relationship between parties, provides a picture of the cognitive ownership of the site. Unless these meanings, landscapes and relationships are fully understood, the cultural heritage management of each place will be founded only on partial understanding of the site, and will result in unsatisfactory solutions to management issues.

INTRODUCTION

Localities open windows onto the complex interactions that connect the spheres of politics, culture and economy (Anderson, 1993:83).

The definition of cultural places, both in the popular eye and the official vision, tends to be limited culturally, temporally and geographically. This limitation may be defined as being mono-cultural or mono-ethnic, to a lesser extent mono-temporal, and most frequently micro-geographical. By these terms, it is meant that cultural places tend to be defined simply by reference to one cultural and often
ethnic, group who either claims or is attributed some form of sole proprietary right over the cultural capital – the material values and meanings, ascribed to the place. Associated with this is a tendency to identify the place in terms of a static history – a fossilised meaning attached to one or few points in time. Lastly, the places are usually identified as specific points, often very small points, in some ill-defined landscape. This approach to defining cultural places has several serious implications. At an intellectual level, it defies meaningful understanding of the cultural, social, political and geographical role of the place. This arises from a denial of the multiplicities of meaning attached to any place, the modes of construction of these meanings, and the roles of the place within both successive and overlapping social, cultural, political and geographical landscapes. This intellectual denial results in more serious pragmatic problems. Contemporary political and administrative issues of site access, use and management become blurred in a myopic vision of simplistic notions of the meanings of the cultural place. Founded on a limited set of assumed real and absolute meanings – meanings which allow a monolithic approach focused on the absolute correctness of one history or culture over all others – discussion and debate become at best trivial and at worst inappropriate, unnecessary nad adversarial. This situation may result in management focusing on non-issues or ignoring unknown issues.

It is well recorded that individual cultural heritage sites have traditionally been the administrative and legislative focus of cultural heritage management (e.g. Ellis, 1994, English; Flood, 1990; Hall & McCarthur, 1993). However two trends suggest that such a site-focused approach is becoming increasingly inappropriate both in and beyond Australia (e.g. Kerber, 1994). Merging these may provide a means for improving the quality of management. Archaeological concepts of cultural landscape emphasise the interrelationships rather than the individuality of sites (e.g. Head et al., 1994), and the importance of landscape and environment rather than the individual site in understanding past human behaviour (e.g. Butzer, 1982; Ortloff & Kolata 1993; Zhichung Jing & Rapp, 1995; Pärssinen et al., 1996). At a broader social level, the increasing awareness and vocalisation of indigenous and other community claims to land and places (e.g. Toyne and Vachon, 1984; Allen, 1992; Lippman, 1994) draw attention to the complexity of interest in sites within any landscape. This latter process results in an increasing indigenous and community involvement in site and area research and management (e.g. Tjamiwa. 1991; Birkhead et al., 1993; Kerber, 1994; Layton 1994a, 1994b; Nutting 1994; Hortsman & Downey 1995). With the acceptance of such ideas, it has become recognised that cultural heritage sites exist within complex modern social landscapes. Building upon these emerging issues within cultural heritage research and management, it may be possible to develop an approach by which cultural heritage managers are able to recognise and identify such modern social landscapes and their components. With recognition comes an ability to operate within that complexity. Experience in Australia suggests that this has not often been done successfully – there are many examples of sub-standard heritage management (e.g. Birkhead et al., 1993; Boyd & Ward, 1993) – with resolution of issues of cultural heritage and site management often
resulting in litigation (e.g. Allen, 1995 and references therein). Litigation seems to stem from a poor understanding of the relative roles of all interested parties and the complexity of context of the cultural heritage under discussion.

**SOCIAL CONSTRUCTION AND THE MULTIPLE MEANINGS OF HERITAGE SITES.**

In this paper the complexity of social contexts of cultural heritage sites is discussed in relation to the management of such sites. The approach adopted mirrors the use of the social construction theory in analysing the definition of places (e.g. Jackson, 1991; Paasi 1991; Pratt, 1991) and social and political movements, especially in relation to socio-economic imbalances and attempts at self-determination and self-empowerment (see, for example the case studies in Jackson & Penrose 1993). Social construction theory is founded on the concept that to understand, for example, both why and how social conflict occurs, it is necessary to recognise that all proponents within the conflict have their own understandings of both the definitions of the locality which physically bounds the issue, and of the issue itself (e.g. Haugh, 1995; Huggins et al., 1995; Jacobs, 1995). Behind such an argument, of course is the concept that meanings are not inherent, but are constructed by those who hold them. The meanings tend to be group-based and thus give rise to the term ‘social construction’. A characteristic of social landscapes is that they are largely influenced by interacting, multiple socially-constructed meanings. The interaction between these multiple meanings contributes to the definition of the nature and course of any social behaviour.

Such an idea of diverse understandings or multiple meanings may be usefully extended to cultural heritage management. Whereas there has been a conventional diversity in the forms of evidence, including social significance, used to define the official significance or importance of cultural places (Anon, 1990, 1994), there has only been a limited application of social construction theory and little recognition of the diversity and complexity of constructed meanings in cultural management (Jacobs, 1993). This paper suggests that a more extensive use of social construction theory may have some practical advantage in cultural heritage management, in that it allows a management recognition of the realities of interest in a site without requiring value judgements of the validity of those interests.

At any cultural site, there are often many groups of people who have characteristic interest in, or claim of association with, the site. This interest or association can usefully be described a ‘cognitive ownership’, in that it represents the link between people and place defined by some form of intellectual, conceptual or spiritual meaning that a group or individual attaches to the site. It does not imply legal or economic ownership. For each party, a site is defined by some constructed meaning, and represents a point within a particular landscape, that point being but one node within a network of linkages, pathways, edges, landmarks and areas within the landscape (e.g. Matthews, 1992). The site is rarely viewed by any party as an isolated individual point; its landscape relationship is constructed in terms of individuals’ cognitive maps, these representing the cumulative effects of a wide range of
social and cultural influences (e.g. Gould & White, 1986; Haynes, 1981; Stoltman, 1980; Tuan, 1977). Such construction is not confined to the present, and indeed forms the basis for much of the archaeological interest in cultural landscapes (Head et al., 1994). Identification of Aboriginal pathways, nodes, landmarks and areas is possible through the examination of for example, material sites, rock paintings and ethnographic record, and provides a means to recognising some detail of past cognitively mapped landscapes (e.g. Gosden & Pavlides 1994; Hall & Lomax, 1996; Head 1994; Taçon, 1993, 1994). It is, however, with contemporary constructed landscapes that this paper is primarily concerned. For any cultural heritage site, the modern landscape of each cognitive owner differs, in some case radically, from that of every other party (cf. Boyd et al., 1994a,b). Identification both of the individual meanings and landscapes, and that of the relationships between parties, provides a complex picture of the cognitive ownership of that site.

By placing cultural heritage into such a diverse and multi-faceted constructed social context, it becomes appropriate that cultural heritage management must now take account of this diverse context if it is to achieve maximum success in its activities. Maximum success may be defined as putting in place such management structures and actions that allow the cultural heritage to be maintained in a culturally-sensitive manner. This allows all the interested cognitive owners to have access (not necessarily physical) to the cultural resource without detriment to the resource itself or any of the other cognitive owners. To achieve such a goal, it is necessary for cultural heritage managers to fully understand the multiplicity of cognition – the meanings, landscapes and relationships – associated with a site. Without this understanding, the cultural heritage management of any site will be founded only on partial understanding of the site and, of particular importance, those people who maintain some attachment to the site, and will result in unsatisfactory solutions to management issues.

In this context, it should be noted that the cognitive ownership described in this paper differs fundamentally from concepts of social, and indeed any other, significance commonly used in heritage management (e.g. Anon., 1990, 1994; Carver 1996; Coutts & Fullager 1982; Darvill et al., 1987; Godden 1991; Parrott 1991; Pearson 1984; Schaafsma 1989; Sutcliffe 1984; Young 1990). The social significance of a heritage feature is predominantly identified as some value or set of values that imparts a sense of importance upon that feature; the focus is clearly upon the site or heritage feature and its inherent qualities. In a formal setting, this translates into values used to assess the heritage importance, and thus forms the basis of whether any management should be implemented. Cognitive ownership, on the other hand, does not involve a value judgement, and should not imply one. It is a statement of association and constructed meaning which, while being associated with the heritage site or feature may contribute to an assessment of the social value of the feature, is primarily a function of the people who associate with that heritage feature. Rather than being an inherent quality of the heritage feature, it is an inherent cognitive quality – the consequence of the “activity of knowing: the acquisition, organisation and use of knowledge” (Neisser, 1976:1) – of those people who construct
meaning about the heritage feature. In this way, it is not used to assess the importance of the heritage object, but provides factual input to the management process where that process is concerned with the management of people associated with the feature (cf. Hall & McArthur, 1993). As with all studies of social construction, “[t]he concern…is not with the truth or the validity of one claim over another, but with the context” (Jacobs, 1993: 105). Adopting a social construction approach in heritage management thus shifts the interest from the validity of any individual group’s claim to a heritage feature, to an acceptance of the reality of that claim, and of the full range of such claims, regardless of their validity.

**CASE STUDIES**

**THE BEACHMERE MIDDEN COMPLEX, MORETON BAY, SOUTHEAST QUEENSLAND**

This case study is dealt with in greater detail than the previous three, largely since a greater understanding of the many interested parties and their interactions is now available. This understanding is a by-product of litigation associated with an application for proposed sand extraction in the area of the midden complex. This process requires the explicit statement of interest from all parties, and allows for a detailed examination of the relative roles and views held by each party. The following account identifies these parties and presents a synthesis of their roles and interrelationships and attempts to be an objective statement of roles and relationships; no value judgement is presented upon any individual party or the litigation process.

The Beachmere midden complex is comprises several shell middens of varying areal extent and depth, primarily deposited in the unconsolidated Quaternary alluvial and coastal plain sediments of Deception Bay, an embayment in the northern sector of Moreton Bay (Figure 12.1). The notion of “midden complex” used here is not indicative of a strict or measured temporal relationship between shell middens of the area (since few have been dated), but rather reflects the use of a cultural landscape model in the interpretation of aboriginal cultural heritage remains within the Beachmere area. A cultural landscape model is considered appropriate for the area since individual middens are linked: they are linked spatially by their almost ubiquitous occurrence within the unconsolidated Quaternary sediments of Deception Bay; ethnographically by historical accounts of aboriginal pathways within the area; and biogeographically by their similar proximity to known resource exploitation zones -- estuarine mudflats, tidal lagoon and freshwater swamp deposits (Cotter, 1995a,b, c).

---

10 In the original paper to provide example of the complexity of interests and landscapes, and the social and physical contexts of cultural heritage sites, four case studies were described. Three of these case studies [the Suffolk Park historical shipwreck, the Byron Bay historical whaling station, the Gumbooya Aboriginal rock engravings site in Sydney] were briefly discussed. The fourth case study derived from this research and centred round my reflections on the contestation at Court of the Indigenous Heritage values known and or recognised for Lots 162 & 163 Beachmere [i.e refer to Chapters 9 & 10]. As the initial catalyst for the development of the concept of “cognitive ownership” this case study was presented in more detail. For the purposes of this thesis the original text of the paper has been abridged to only include the text published for this more detailed case study.

11 See Section I, Chapter 2.
Recent landuse developments present a threat to the integrity of this archaeological location. The context of these developments is set firmly within the regional pattern of urban and suburban growth.

Beachmere is a coastal township located north of the Caboolture River mouth and close to the shoreline of Deception Bay (Figure 12.2). It is c. 12 km east-southeast of the regional centre of Caboolture, c. 50km north of Brisbane, and has become a popular destination for retirees (Caboolture Shire Council, 1993). The local government the Caboolture Shire Council is one of several faced with managing rapid population growth and urban expansion (South East Queensland Regional Planning Advisory Group, 1993, 1994). The Caboolture population has grown at 8-10% annually over the last 20 years, anticipated to accelerate as the growth in Brisbane shifts from the south to the north (Loose 1993); Beachmere is considered to have a capacity for further residential development and its population is expected to double within the next fifteen years (Caboolture Shire Council, 1993; South East Queensland Regional Planning Advisory Group, 1994). Pressure on land resources is, therefore, intense. In a recent Environmental Impact Statement (EIS), one of the shell middens within the Beachmere midden complex (M12 Figure 12. 2) was identified as lying within land subject to a sand extraction proposal (Maher & Associates, 1994). In light of the rapid urban expansion within S.E. Queensland, a proposal for new sand extraction operation can be seen to meet the potential and actual demands of materials for the housing and general construction industries (O’Flynn, 1992). The EIS,
inclusive of a cultural heritage section, was favourable to the proposal. However, in response to the nature and extent of the objections to the proposal (more than 2,000 objections were tendered to Council), and despite recommendations from its Planning Department, the Caboolture Shire Council rejected the application in April 1995. Subsequently the developer lodged an Appeal against the Council’s decision with the Queensland Planning and Environment Court. Proceedings were held from the 16 – 23 of October 1995; on 25 January 1996, His Honour Judge Quirk JDC presented a finding in the appellants favour.

![Map of Beachmere and Deception Bay](image)

Figure 12.2. The Beachmere midden complex illustrating the distribution of sites in relation to cadastral boundaries. M12 denotes the midden which has become one focus of a Planning & Environment Court dispute (Image courtesy Dr Jay Hall, Department of Anthropology and Sociology, University of Queensland).

Although it is not intended here to give substantive detail of the litigation concerning the Beachmere midden, some information is necessary to explain the relevance of cultural heritage management issues to these proceedings. Firstly, under the *Queensland Local Government Act 1990* individuals or groups who lodge an objection to an EIS can become ‘respondents by election’ to any subsequent legal appeal by the Developers. In the first instance this entitles each respondent to participate in the legal proceedings, and for this particular EIS, to present an individual case in support of the Caboolture Shire Council’s decision. After the lodgement of the appeal by the developers in this case, almost 100 objectors took up the option to be respondent’s by election. This unprecedented number of respondents was considerable cause for alarm during the initial hearings, with the Judge pointing out that it was best for individual objectors to pool resources and seek proper legal representation. The local residents of Beachmere took up this advice and by the time the action finally came to Court the following groups were parties in the legal proceedings: The State of Queensland, particularly the then
Many of the issues initially raised by objectors with regard to the Beachmere midden case were resolved prior to the court action and were therefore not considered further. However one of the substantive issues, pursued both by FAIRA and the LRG, was one of inadequate consultation of all Aboriginal groups having a claim of association with the site by the cultural heritage consultant employed by the developers. In addition the LRG argued that the archaeological assessment of the midden presented in the EIS was inadequate. These issues thereby involved the State of Queensland because officers of the Cultural Heritage Branch of the then Department of Environment and Heritage (DEH) had accepted and approved the Cultural Heritage Assessment Section of the EIS. Hence at least for this aspect of the Court Proceedings, the State of Queensland was in support of the developers, and in fact given a general resolution of conditions placed on the development proposal by the DEH, the State of Queensland had, in principle, accepted that the operation should proceed. Significantly, the Caboolture Shire Council remained a passive participant in the Court proceedings, with the case opposing the development application only actively being pursued by FAIRA and the LRG. In fact the local residents became and remained participants in the litigation process because of a concern that the Caboolture Shire Council would not adequately represent their views in Court. What clearly emerges from this process is that there is a diversity of interest and a range of parties who may, in the terms discussed above, lay claim to some form of "cognitive ownership" of the cultural heritage which lies at the centre of this dispute.

The primary groups of parties are depicted in Figure 12.3. It is important to note that the double-ended arrows are used in this figure to indicate that both the notion of cultural place and the interests of parties in cultural places are neither static nor absolute. Each may be influenced by the links between potential parties (government legislation, for example, may affect the manner in which groups and individuals define and express their association with a cultural place) and by the potentially dynamic nature of the interrelationships between individual parties and cultural places. The mining industry, for example, can be seen to have a capacity to create, destroy, modify and/or interpret places of cultural heritage value, depending on such criteria as the nature of the place, economic imperatives and historical perspectives. A more detailed illustration of the specific parties is presented in Figure 12.4. The initial point emphasised in this diagram is the overarching complexity of the nature of the social landscape in which this cultural place lies, and the definition of the site as either an isolated site or as a broader cultural landscape, and, by implication, the potential effects such interpretations have on parties and their competing interests. Previously, with reference to the notion of “midden complex”, a cultural landscape model was deemed appropriate for the interpretation of cultural heritage within the Beachmere area. In this approach individual middens may, for example, become
significant because of their spatial, ethnographic and biogeographical links to each other. However, if each midden is considered in isolation and particularly as a site type demonstrably common to the area, then the interpretation of the site's significance is necessarily different.

Irrespective of the above noted interpretative differences, it is clear from the nature and number of identifiable parties, that a complex variety of claims to association with and/or cognitive ownership of the Beachmere midden complex exist. It must also be noted that in this case, the nature of the perceived threat to the cultural heritage to some extent defines those groups and individuals who claim an association with that heritage. Of the non-indigenous community groups illustrated in Figure 12.4 it is clearly a perceived threat to the broader regional environment which produces the claims to association by such groups as the Sunshine Coast Environment Council and the Bribie Island Environmental Protection Association. Indeed the concerns of these groups relate to wildlife habitat depletion, particularly for avifauna, and the possible deleterious effects of acidic water runoff on the fishery of Moreton Bay.

The principal non-indigenous community group which makes claims of association with the subject land is the Beachmere Community Association, on the basis of the threat to the local amenity, including threats to native plant and animal communities, noise and dust pollution, increased vehicular traffic and concomitant road deterioration. Likewise economic concerns, primarily relating to probable land devaluation, were critical to the opposition by local residents. These concerns are clearly related to Beachmere’s community structure, with factors such as higher than average home
ownership, lower mobility and a predominately retired population all contributing to anxiety over land devaluation.

Figure 12.4. The specific parties in the Beachmere midden complex. This figure is not exhaustive but identifies the principal groups and individuals with a claim to association with this cultural heritage site. Key to abbreviations: ATSIC = Aboriginal and Torres Strait Islander Commission; AHC = Australian Heritage Commission; ACDO = Australian Cultural Development Office; ANCA = Australian Nature Conservation Commission; DEH = Department of Environment and Heritage; DM&E = Department of Minerals and Energy; DLG&PL = Department of Local Government and Planning; DAIA = Department of Aboriginal and Islander Affairs; DMR&T = Department of Main Roads & Transport; SCU = Southern Cross University, Lismore, NSW; UQ = University of Queensland, Brisbane, Qld; (MRAP) = Moreton Region Archaeological Project.
Interestingly, from an Aboriginal cultural heritage management perspective, local residents were supportive of those indigenous community groups who, largely on the basis of inadequate consultation and a perceived threat to items of their cultural heritage, opposed the sand extraction operation. Much of this non-indigenous community support can be attributed to genuine concern for Aboriginal cultural heritage. An element of this support, however, is derived from the perception that indigenous cultural heritage issues, because of their complexity and sensitivity, are likely to be pivotal in preventing the sand extraction operation entirely, and thus preserve the local amenity for all Beachmere residents.

Some of the linkages existing between groups with particular claims of association with the midden itself are presented in Figure 12.5. Of the indigenous community groups identified, FAIRA makes a claim of association with the midden on the basis of 1) a general concern for Aboriginal cultural heritage, and 2) a perception that a research methodology was not employed in the original EIS which could adequately establish the legitimate claims to cognitive ownership of the midden by the specific Aboriginal groups involved. Whilst FAIRA can be seen as an organisation with interests shared by all indigenous community groups, its advocacy role is not necessarily supported by all indigenous groups, hence the linkages presented are not drawn to reflect any mutual two-way relationships. The groups labelled Gubbi Gubbi 1 and Gubbi Gubbi 2 (Figure 12.5) claim cognitive ownership of the midden and the entire Toorbul Peninsula, on the basis of tribal and kinship affiliations. The two principal individuals representing each Gubbi Gubbi group maintain that Gubbi Gubbi tribal boundaries incorporate the Beachmere midden. However these two groups differ since the group referred to as Gubbi Gubbi I maintains kinship affiliation based on patrilineal descent, whilst Gubbi Gubbi II representatives maintain that primary descent and kinship affiliations are vested with the matrilineal line.

In contrast the Dalaipi group is representative of a social action organisation primarily concerned with assisting local Aboriginals with access to housing and health care. This group is linked to the Jindoorburrie organisation by the notion that “we look after social things and the Jindoorburrie concern themselves with cultural heritage” (Dalaipi President *pers comm.*, 1994). The association these two groups have with the midden is thus based directly on social and historical attachment to the area and a clear delegation of cognitive ownership rights to the cultural heritage of the area. This cognitive ownership is based on a tribal affiliation to the Undanbi tribe which is considered by the Jindoorburrie to be the only tribe with ownership rights to the Beachmere midden, and thus has a cognitive ownership right clearly in opposition to the Gubbi Gubbi groups who also claim exclusivity of ownership based on tribal affiliation.

It is the competing claims of tribal affiliation with the Beachmere area noted above which form the basis of the complexities involved in the cultural heritage management of this midden. This
The indigenous situation is potentially complicated by a Trainee Heritage Officer with the Department of Environment and Heritage who has affiliations to the Dalaipi and, to a lesser extent, with the Jindooburrie organisations, and an historical link to the area as a former resident of Beachmere. The Trainee position is necessarily influenced by Departmental policy and research methodology, and is potentially influenced by the above-noted social affiliations with particular Aboriginal groups. Thus, whether real or imagined, it is clear that a potential conflict of interest arises which may affect the implementation of Government policy and, more importantly, give one group of Aboriginals access to decision-making bodies to the potential detriment of the other groups.

Figure 12.6 summarises the particular claims of association to the midden based on economic imperatives, which to a large extent directly result from the EIS process. The linkages here are self-explanatory and the figure is presented largely to emphasise the layers of associations with this midden which must be negotiated if effective cultural management is to be achieved. The critical observation to be made is that it is at this level of association that the professional training and experience of cultural heritage consultants, both indigenous and non-indigenous, most affects the management outcomes of cultural heritage places. This link between the economic process and cultural heritage consultants is at the crux of a wider ethical debate, a debate which is outside the scope of this paper. For the Beachmere midden, as elsewhere, the pivotal role in cultural heritage management is that played by the Regional Archaeologist. Figure 12.7 displays some of the critical
The case studies presented here represent a range of cultural heritage locations. A common theme throughout is that in each case several interested parties can be identified, each with a characteristic claim of association with, or cognitive ownership of, the site. For each party, the site represents a point within a particular physical, social and political landscape; neither the point nor the landscapes are static. Identification of the individual interests and landscapes, and the relationship between parties, provides an often complex picture of site ownership. Such an approach to heritage sites is based on social construction theory, in which the diversity of meanings constructed by different groups of people can be analysed as a form of analysis of social issues. This contribution of social
Construction theory is illustrated in this paper in two ways. First, the three case studies from Suffolk Park, Byron Bay and Gumbooya identify and document the divergence of socially constructed site meanings held by groups of cognitive owners at these sites. Secondly the complexity and dynamism inherent in the diversity of cognitive ownership is illustrated in the analysis of events surrounding the resolution of court proceedings associated with the Beachmere midden complex and proposed changes in land use. The emphasis in all the case studies is not on the validity of the meanings but the reality of their existence, and the outcome for cultural resource management in general includes a greater understanding of the...
process of interaction between parties. As such, this approach provides an important contribution to cultural heritage management since the social constructions, the statements of cognitive ownership expressed as meanings, landscapes and relationships may be more fully understood, without necessarily impacting on the value judgements required in the formal assessment of site significance. Without such understanding, the practicalities of cultural heritage management of each site will be founded only on partial understanding of the site, and will result in unsatisfactory solutions to management issues.

Figure 12.7. In this figure the central responsibility for the management of cultural heritage sites, which for the Beachmer midden is vested in the role of the Regional Archaeologist, is depicted.
CHAPTER 13

THE MULTI-VOCALITY OF LANDSCAPE I: OTHERNESS AND MARGINALISATION

ENCULTURING CULTURAL HERITAGE: THE OTHERNESS OF HERITAGE AND THE MARGINALISATION OF ITS REPRESENTATION.

Boyd, W.E. & Cotter, M.M.
School of Resource Science and Management, Southern Cross University, Lismore NSW.

Published book chapter


Concept and design of research

Concept: Boyd 50% Cotter 50%
Project Design: Boyd 50% Cotter 50%

Collection, analysis and interpretation of data

Collection analysis and interpretation of case study data: Cotter

Writing

Writing: Boyd 50% Cotter 50%
Proof reading and edits: Boyd 50% Cotter 50%
CHAPTER 13

THE MULTI-VOCALITY OF LANDSCAPE I: OTHERNESS AND MARGINALISATION

ENCULTURING CULTURAL HERITAGE: THE OTHERNESS OF HERITAGE AND THE MARGINALISATION OF ITS REPRESENTATION.

ABSTRACT

An examination of the social and landscape contexts of most cultural heritage rapidly reveals a diversity of intellectual interest of each item of heritage and a multiplicity of values and meaning attached to it. Current intellectual discourse within any social and cultural domain supports such diversity and multiplicity of meaning and value. Moreover, further attention is usefully focused upon the relationships within fields of values, and effects these may have upon the creation of the identity or identities of the heritage. Such consideration should cause concern for traditional cultural heritage management. Heritage management concepts largely conform to a hegemonic discourse of the construction of “otherness”, characteristically a colonial discourse driving the practicalities of heritage management. In essence, limited definitional perspectives are imposed upon cultural heritage and the places it occurs at. However, consideration of the social construction of values attached to such heritage results in the recognition of the existence of diverse values and value-holders. Deeper examination of values represented soon gives way to the recognition that these values are temporally and culturally fluid. This paper discusses some of the processes of the construction of cultural heritage values against a backdrop of a case study from eastern Australia. The case study demonstrates that the value of place is fluid, reflecting influences of historical conceptualisation of social, cultural and natural landscape, and contemporary environmental determinism. These conceptualisations locate cultural heritage into a shifting landscape exhibiting at times considerable fluidity of meaning, emphasis and acceptance, and thus emphasising the multi-dimensional character of, in particular the place at which the cultural heritage is represented.

OTHERNESS AND MARGINALISATION: ANOTHER PLACE FOR CULTURAL HERITAGE

[The rural] is no longer one single space, but a multiplicity of social space... each of them having its own logic, its own institutions, as well as its own specific network of actors (Mormont, 1990:34).

To name is to possess... we are usually only willing to recognise differences so long as they remain within the domain of our language, our knowledge, our control (Chambers, 1994:30).

We open with these two seemingly disconnected quotations, used by Murdoch & Pratt (1997) in a discussion on the need for a conceptual and methodological redirection of the intellectual
consideration of the “rural”, because they draw attention to two concerns within the domain of this paper -- cultural heritage, its representation and its attributed value. Mormont’s observation, first, points by parallel logic and perhaps significantly from beyond the subject boundaries (following Bhabha (1994) this provides opportunity for a refreshing view of the familiar) to a need within the practice of cultural heritage management to recognise cultural complexity in seemingly homogenous phenomena. Chambers, on the other hand, simultaneously draws attention to serious limits in our ability to recognise and accept cultural diversity, and indicates a potential source for much of that diversity. The former action probably reflects well the intent of Chambers’ statement, whereas the implications of the latter are probably unwitting. Murdoch & Pratt’s argument lies in the recognition of the ‘other’, a contentious but useful concept drawing notice to people, places, behaviour and values which are present but peripheral, marginalised, unwanted or ignored -- and thus often opposed or made invisible -- in traditional (and contemporary-traditional) visions of the rural. They contend that the very structure of study defines the content, and thus the form, classification, delineation, questions, and so on are constrained by the existing structure of knowledge: this limits any real expansion or progress in the intellectual process of understanding. Philo (1997) draws on Foucault’s (1986) ideas of “other spaces” both to illustrate the concept, and to add the important dimension of time to the issue:

...the prevailing conceptual frameworks shaping peoples’ experience and interpretation of space have changed quite dramatically over time, thus implying that ‘the space which today appears to form the horizon of our concerns, our theory, our systems’ (Foucault 1986:22) is itself a human construction - an invention, albeit one with deep historical roots - quite different from earlier senses of what space entailed, comprised or signified (Philo, 1997: 37).

This line of argument, part of an attempt to expand the cultural relevance of rural studies, has strong resonance in the domain of cultural heritage studies, most poignantly where the pragmatics of management demand a statement of ‘heritage value’. Here, the ‘rule of repeatable materiality… by which statements from one institution can be transcribed in the discourse of another’ (Bhabha, 1994:22), can be appropriately applied. The parallels with the concepts of otherness are equally strong, especially, again, within the context of the pragmatic of cultural heritage management. Traditionally, heritage is managed as given, often as essentialist places, with unambiguous or, at most, partially contested value. Contestation - even political disagreement about cultural ownership - tends to reflect practical aspects of on-site or item management rather than fundamental debate about the construction of the heritage itself. Sites tend to be identified in culturally, temporally and geographically limited ways reflecting the hegemony of dominant culture: they are mono-cultural or mono-ethnic, to a lesser extent mono-temporal, and most frequently micro-geographical (Boyd et al., 1996). By this, several processes are assumed. First, the cultural heritage is defined by reference to one cultural (and often ethnic) group who claims or is attributed sole proprietary rights over the cultural capital of that heritage. Secondly, the heritage is identified in terms of a static history which fossilises meaning to few single points in time. Finally, the heritage is defined by its immediate surroundings (often
practically expressed in land tenure terms and physical fencing) as an individual point apparently unrelated, or if related, only tokenistically, to its landscape contexts. Thus cultural heritage is managed within the rationalist and reductionist philosophy of an essentialist science: a place is a place. Ironically, by imposing constraint and conformity upon the meaning of the place, such a scientific perspective identifies the place as ‘other’, by definition different from the mainstream of ‘ordinary’ social life. This ‘other’ is typified in the many ways more commonly applied to social and cultural groups conventionally discussed in the academic discourses of social and cultural otherness: the heritage is typically a minority cultural phenomenon, of an unusual character, non-functional at least in a material context, marginal both functionally and often spatially, cost-ineffective and often ‘welfare’ dependent (i.e. it costs, usually from the public purse, to maintain), non-productive, dispensable when conflict of land use arises, culturally and politically confronting and often politically marginalised, readily romanticised or otherwise defined externally, and so on (cf. Philo, 1992; Cloke & Little, 1997).

By recognising an otherness, and indeed many ‘othernesses’ of cultural heritage, it is possible to delve more deeply into the underlying cultural construction of cultural heritage. Revealing such constructional relationships between heritage, its attributed (assumed?) meanings and society sensu lato provides opportunity to contribute a more meaningful discourse to the actions of cultural heritage management. Cultural heritage managers, however, tend to be ambiguous about this: in a short comment entitled ‘Academics and heritage’ in a text book on managing ‘heritage places’ for example, the authors state:

*Academic developments in a number of fields...often takes the form of a critique of current methodology and the assumptions underpinning it. The direction this might take the heritage assessment process is to make it look more at the world of symbolism and meaning, and to rely less on the traditional assessment of morphological, stylistic and technological attributes of the fabric. ... These contributions have enriched and given depth to cultural place assessment in a number of ways...[but]...it is clear there is a sometimes worrying gap between the academic and the popular heritage movement. Neither has the ‘truth’ or the answer. But the problem seems to be that, while the expert increasingly strives for methodological purity, popular culture moves towards the emotion and the mythology of heritage. ... There is a need for more dialogue, and more exchange between academic and manager in the field of heritage conservation to ensure good practice and to strengthen the link between cultural critique and the actual cultural landscape ...* (Pearson & Sullivan, 1995: 311-312; emphasis added).

Such conflict or perhaps even confusion of perspectives echoes Cloke’s (1997) concerns whether the ‘different cuts on morality - the personal imagination of the researcher and the revealed presuppositions of the researched - can coalesce without mutual exclusion’:

*Are we really faced with the choice between a normative and insensitive imposition of the idea ‘poverty’ onto pre-formulated social groups clearly located by pre-theorised processes of inequality [for cultural heritage, read ‘the idea of ‘heritage’ onto pre-formulated places and spatial relationships clearly located by pre-theorised processes of cultural identity’], and a sometimes touristic (and maybe even voyeuristic) intrusion into...*
the different experiences of what might be called poverty in some individual discourses but which is often hidden from sight by the broader exercise of discursive power [for cultural heritage, read ‘of what might be called cultural heritage in some individual discourses but which is hidden from sight or sanitised by the hegemonic discourse defining historical or Indigenous culture’] (Cloke, 1997: 253).

Cloke does not consider this choice is necessary, although while representing a position too simple, does allow a more insightful examination of, in his case, the idea of poverty. Likewise, it is argued here that a multiplicity of perspectives, especially viewed within some intellectual context of contested domain, allows us to gain an increasingly meaningful understanding of cultural heritage, its meanings, representations and places and the relationships between these are the society which constructs them.

A key concept in this regard is that of the creation or construction of meaning and identity of cultural heritage and its representations; and it is when we enter this terrain critically that we encounter contest. Officially, the representations of cultural heritage whether manifest as an item, a place or an idea are usually defined in uncontested (and from the official perspective, once constructed, incontestable) and predetermined terms, by association with elements of “high” culture, codified into governmental heritage assessment (and significantly anonymously authored) guidelines (e.g. Anon, 1990). While ostensibly these clear-cut terms of reference - statements of significance based on historical, architectural, scientific, archaeological, social and cultural knowledge -- should provide an unambiguous indicator of the cultural importance of the heritage, this is often not the case. Definition by this means is frequently inadequate, resulting in a minimalist definition (spatially, culturally, ethnically, etc., as outlined above; Boyd et al., 1996), which within a broader social context is often contested. Contestation arises from the mismatch between everyday social expectations of cultural value (usually not articulated as such) and official statements of cultural value: official history rarely equates to popular histories, for example (Darien-Smith & Hamilton, 1994; Schmidt & Patterson, 1995), whereas popular or folk culture which may challenge, counter and question the dominant received wisdom of upper and middle class “high” culture is ignored (Fiske, 1989). To understand the processes lying behind such difficulties, and ultimately, in a practical sense, to arrive at a process of cultural heritage management which more closely meets social expectation, it is important to identify the relationships between representation of heritage, people and values held, and the processes linking these. Clarke and Smith (1996) echo this statement and note, for example, that:

The placement of cultural resource management within the bodies and discourse of the state has institutionalised and codified archaeological knowledge and ideology. The management of cultural heritage can be seen to play an integral part in the definitions and debates over cultural, historical, social and national identities (Clarke & Smith, 1996:4).

As such, the large and growing literature on the politics of identity (e.g. Keith & Pile, 1993) is relevant here, a literature which from many perspectives emphasises not merely the construction and articulation of identity, either from within or without, but also the relationships between those identified and identifying.
As one first step to developing such understanding, the authors previously developed the idea of the “cognitive ownership” of cultural places (Boyd et al., 1996). While this idea was initially developed within the context of discussion of a particular form of representation of cultural heritage, the physical place at which some expression of cultural heritage is located, and is introduced here within this limiting structure, the concept can readily be extended to the idea of the ‘cognitive ownership of the heritage itself. This deliberately provocative term was designed to focus attention on the diversity of socially-constructed values identifiable for any cultural place. Founded on the concepts and pragmatics of social construction (Jackson & Penrose, 1993), the term refers to the interest in or association with a cultural place claimed, even implicitly, by any person or group who attaches some value to that place. It represents the link(s) between people and place defined by some constructed meaning(s), some expression of intellectual, conceptual or spiritual value(s), and articulated through a sense of the landscape within which the place has value. Importantly, the emphasis of social construction theory is the recognition of multiple meanings, and (this is also most important) the issue is not one of the truth or validity of one meaning over another, but merely with their identification. The upshot of applying a cognitive ownership or social construction analysis to cultural heritage places is that for every place, a wide range of ‘owners’ and meanings can be identified. However, further consideration of socio-cultural values at several places reveals a further dimension to this issue (Boyd et al., in prep.)\(^{12}\). In the process of both study and management of such places, values and ‘owners’ shift: new values may come into existence as the site significance is either assessed or becomes more widely known, or existing values may evolve, possibly becoming redundant or elevated in importance; new ‘owners’ may also come into existence with the inevitable change in public perception of the place with active study or management. Such processes apply equally to the broader definition of value of any representation of cultural heritage.

At the risk of over-simplifying such a dynamic system, two key but completely inter-locked elements can be identified: the ‘owners’ themselves, and the ideas they construct and hold. Focusing on the second element, this paper documents historical shifts in attributed value, the ideas about one example of cultural heritage. Returning to the opening quotations, the paper thus explores both Mormont’s theme of the ‘multiplicity of social space’ and Chambers’ theme of the power of possession by integration within a specific language. In this case the language is that of historical context and environmental determinism, and in keeping with the dynamism inherent in both, the values thus recognised, as identified time and again in different research contexts, are ‘constantly changed to reflect the times in which they were produced’ (Halfacree, 1997: 83). Specifically, using a small area containing threatened and unprotected prehistoric archaeological material in Moreton Bay, southeast Queensland, we define, at least in outline, the values attached to, imposed upon, and inferred from this particular cultural heritage and locus of existence in the past and at present -- in effect we map Foucault’s (1986) horizons of our concerns, theory and systems. Thus we aim to demonstrate, as has

\(^{12}\) Boyd et al., 2005 see Chapter 14.
been done in other contexts, and which is, in our view, extremely important for management, that cultural heritage is:

...contingent, fluid, detached from any necessary, stable socio-spatial reference point... [and]...its meanings are asserted relationally ...and are situationally specific; that is, we can know [cultural heritage value] only from and through particular socio-spatial positions (adapted from Murdoch & Pratt, 1997:58).

**LOTS 162 AND 163, BEACHMERE: A MULTIPICITY OF CULTURAL SPACE**

The case study examines the changing and competing cultural heritage values of a parcel of land adjacent to the coastal township of Beachmere southeast Queensland. The subject of this case study is a 129ha parcel of land (referred to as Lots 162 & 163; e.g. Maher & Associates, 1994) situated some 50 km north of Brisbane near the township of Beachmere, southeast Queensland. The shoreline of Deception Bay is c. 650 metres to the east and the study area has a topography of low relief dominated by ridges and swales and sandy soils of low fertility. The land parcel is bounded to the north and northwest by a large *Melaleuca quinquenervia* swamp. Within Lot 162, an Aboriginal midden precinct was observed during an archaeological assessment of this area (Wallin, 1994) commissioned in 1994 as part of a wider environmental impact assessment of a sand extraction proposal for the land (Maher & Associates, 1994). Significantly the archaeological and Aboriginal cultural heritage values of this midden precinct were publicly contested within the context of a Queensland Planning and Environment Court Appeal (Harrison and Genery vs Caboolture Shire Council and ORS) in October 1995. The outcome – a finding in support of proposed sand extraction –effectively denied the cultural significance of the archaeological remains. Key to this denial appears to have been the interpretations which relate the quality of the Aboriginal archaeological remains (*i.e.* low, disturbed) to the presumed environmental quality of pine plantation (also low, disturbed). We consider that this imposition of environmental values upon the presumed values of cultural heritage in the same landscape was of central importance in denying the cultural heritage values. Furthermore, this construction of cultural value has a much longer and more complex history than one which can be attributed solely to the relatively recent plantation phase. The colonial and post-colonial cultural history of this area is replete with constructed evaluations of the environmental quality, many negative, which combine to form a solid, at times internally ambiguous or contested, and nevertheless powerful expression of a Eurocentric cultural imposition upon the meaning of the landscape in this study area.

The study focuses, then on consideration of the contemporary cultural heritage values of this parcel of land in light of colonial and post-colonial land use practices. In particular the case study illustrated the complex interconnectedness of historical, Eurocentric perceptions of the area as ‘alien’ and ‘other’, its contemporary (*c.* 1995) status as a cleared *Pinus elliottii* plantation, and its proposed future status as a site for sand extraction (Maher & Associates, 1994). Central to this interconnectivity is the marginalisation the area as ‘alien’ within both colonial and post colonial hegemonic discourses of land use focusing on the description and discovery of prime agricultural land (*e.g.* Hodgkinson, 1845;
Lang, 1861; Russell, 1888; Meston, 1895; Weedon, 1897). Also central is the reinforcement of this marginal status by current heritage management frameworks which focus on the management of the notional ‘site’ rather than a wider, more encompassing – both physically and intellectually – ‘landscape’ (Ellis, 1994; Ross, 1996). Yet this colonial and post-colonial ‘alien’ landscape demonstrably occurs within the somewhat more fluid, and to the colonial eye if not the mind, visible boundaries of an ethnographically and (more lately) archaeologically documented Indigenous cultural landscape (Boyd et al., 1996; Cotter, 1996), and Indigenous cultural landscape which is diverse, encompassing and integral rather than alien in its attribution.

The juxtaposition of notions of ‘alien’ - a significant form of ‘Other’, and in the following restated and reiterated in varying forms of ‘wilderness’ - and Indigenous concepts of ‘integral’ (‘Same’), is succinctly demonstrated for the study area in the context of the a recent environmental impact assessment commissioned to asses the future use of the land as a site for sand extraction. In reality the contemporary ‘alien’ landscape of the cleared Pinus elliottii plantation is attributed a more complex ‘alien’ subtext through its association with the colonial ‘otherness’ of Indigenous culture, an otherness early attributed in another form to the Aboriginal people of the district by their close (and early on, observed and recorded) normative and cognitive associations with the ‘disagreeable’ wilderness of the Melaleuca swamps on this coastal plain. Further marginalisation of the environment continued with attempts to establish various rural agricultural industries - usually marginal ones anyway - in the district; the failing of marginal agriculture in marginal land reinforced the attitudes of otherness of this place: the assumption of a ‘tameable wilderness’ thwarted by the ‘disagreeable’ wilderness. Final marginalisation of the representation of an Indigenous cultural heritage within hegemonic management structures was reinforced by the complete destruction of the pine ‘wilderness’ by logging. In essence the current landscape reflects the cumulative effects of the colonial and post-colonial attributions of this landscape as ‘alien’ and ‘other’, and the concomitant effects of the hegemonic control of such perceptions on the valuation, utilisation and disposal of this landscape.

Significantly, however, the case study also reveals that several post-colonial changes in land cover and landuse within the area have both actively and passively, subverted and challenged the hegemonic concept of alien ‘landscape’. This is best illustrated by the regional development of Pinus elliottii plantations within the Beachmere area during the late 1960s and early 1970s. Through the development of pine plantations, low swampy land – ‘unpleasant wilderness’, historically described as ‘disagreeable’ (Eipper, 1841; cited in Steele, 1984:166-167) and ‘tiresome’ (Flinders, 1799; cited in Mackaness, 1956:26), and consequently attributed low economic, social and amenity values – is actively reclaimed as agricultural land and thereby attributed new and central economic value. Ironically, this active subversion of the previously dominant concept of ‘alien’ landscape (through the controlling medium of agriculture) is increasingly challenged by the growth of uniform stands of pine trees and their subsequent evolution into spaces of ‘ordered wilderness’. This passive development of
an ‘ordered wilderness’ – a Teutonic form of wildwood – reinvests the landscape with social, amenity and recreational values frequently attributed to wild ‘alien’ areas (‘wild wilderness’). Yet these attributed values are bounded within agriculturally-defined settings and thus the alien nature or ‘otherness’ of such ‘wild’ pine plantations contrasts markedly with the concept of ‘otherness’ attributed to the pre-agricultural landscape. Furthermore, the recent clearing of immature stands of pine (corporate asset liquidation and urban development pressure at work) within the study area created a newly alien ‘scarred earth’ landscape (‘unnatural wilderness’) which is in contrast to and supplantive of the pre-existing ‘ordered wilderness’ of the extant pine plantation. Ultimately this repeated reattribution of the concept of ‘alien’ landscape reflects the spatial and temporal fluidity of the social construction of landscapes, a fluidity yielding constructions which are simultaneously contradictory and reinforcing. Sufficient, then is the strength of these reinforced constructions that they can and are then imposed upon the values of the cultural heritage represented within the landscape. The imposition of a sequence of overlapping ‘othernesses’ – the various ‘wildernesses’ – repeatedly reinforce the minimisation of value of the cultural heritage.

**DISCUSSION: RETHINKING THE LOGICS OF CAUSALITY AND DETERMINANCY**

This case study, as previous examinations of the physical and conceptual landscapes of other cultural heritage places also do, rapidly reveals a diversity of intellectual interest or cognitive ownership of each representation. The approaches towards constructing values for the heritage, and thus towards a formalisation of the management of this example of cultural heritage, largely conforms to Bhabha’s ‘fixity’ in the ideological construction of otherness” (1994:66), the hegemonic ‘politics of the identification of the imaginary” (1994:22) which are characteristic of colonial discourse which defines meaning stereotypically as a sign of difference. This signification is rigid and unchanging, permanent and given as known, but requiring continual restatement as proof of validity, and, importantly, denying the diversity of cognitive ownership. Thus, in our example, Aboriginal people equated with the natural condition of the albeit disagreeable wilderness of *Melaleuca* swamp, and thus plantation pine trees, being alien and unnatural both in their biological origins and form of emplacement and reproduction within the landscape, bring disharmony and disruption to the Indigenous (both cultural and natural) environment (cf. Agyeman & Spooner, 1997). In essence, single, monolithic and stereotypical perspectives are imposed upon heritage representations, but differently in time thus resulting in historically fluid meaning. Our current perspective tends to be, on the one hand, microgeographical, and on the other, time-limited. Both are logical outcomes of Western thought. The former reflects well the modern Western ethos of land tenure and ownership tied to an individualistic sense of exclusive ownership and occupancy of land. The potential for communality of land tenure and custodianship is denied in Australian social and political life through the perpetual opposition to multiple land use/access/ownership/tenure, currently being played out in debates about Native Title and its implications for overlapping land title, the exclusive use of National Parks for nature conservation/preservation, and increasing concern about perceived public safety issues. It is no
surprise, then, that the concept of multiple cognitive ownership of some phenomenon as marginal as heritage sites is difficult to accept. The latter, time-limitation, is also a logical outcome of a modern Western sense of the punctuated linearity of time. Events rather than the flow or cyclicity of events are important, and concepts of deep time or the subtlety of temporal structure in historical narrative, while nominally espoused in academic discourse, are rarely fully appreciated. For most, 2000 years and 50,000 years ago are both in the past; their differentiation does not matter; in Australian political mythology, articulated by all sides of the black-white divide, history started 200 years ago. However, such simple but constrained cultural construction is confounded by historical seepage, hangovers from previous cultural constructions. Two hangovers are important. The first is the reframing of the 19th century Noble Savage, the tribal native, innocent and at one with nature. This is expressed in several ways, both from within and without Indigenous society. The Indigenous claim to places representing some form of cultural heritage is often founded on an environmental purity which articulates and reflects the colonial fascination for the closeness of Indigenous people to nature, and, importantly, represents the intellectual culture of the 18th century explorers of the Enlightenment in Europe as any contemporary framing of Indigenous life. Such themes continually emerge in contemporary cultural heritage management, and indeed may be viewed as being central to these. The most material expression of this is the administrative separation of European historical and Indigenous heritage into governmental bodies. In New South Wales, for example, European heritage is managed within a Department of Urban Affairs and Planning, a decidedly ‘human affairs’ administrative body, whereas Aboriginal heritage is firmly placed within the responsibility of the National Parks and Wildlife legislation and service, an unambiguously ‘nature’ body: the ‘otherness’ of Indigenous heritage could not be more centrally stated.

In contrast to the hegemonic monolith of meaning ascribed to cultural heritage, consideration of the social construction(s) of the values attached to such heritage, whether it is ‘European’ or ‘Indigenous’, results in the recognition of the existence of diverse values and value-holders, and thus confounds the fixity of the hegemonic construction. Deeper examination of values represented soon gives way to the recognition that not only is there a diversity of values attached to such heritage, but that they are temporally and culturally fluid and that they are interactive; thus the heritage itself becomes fluid, its meanings evolving, conflicting, reflecting and self-reflecting, and in extreme cases, in relation to everywhere else, disappearing. Such analysis places cultural heritage into what Mol & Law (1994) describe as a third space or a fluid space, in which ‘nothing comes neatly packaged into insides and outsides, Sames and Others, here and there’ (Murdoch & Pratt, 1997: 63). Mol & Law (1994) define key elements of fluid space thus:

_A fluid space ... isn’t quite like a regional one. Difference inside a fluid space isn’t necessarily marked by boundaries. It isn’t always sharp. It moves. And a fluid space isn’t quite like a network, either. For in a fluid elements inform each other. But the way they do so may continually alter. The bonds within fluid spaces aren’t stable_ (Mol & Law, 1994: 663).
Thus, while a cultural heritage representation is logistically located at a single geographical point, and defined conveniently in an apparently unambiguous way, in reality, its multiplicity and fluidity of constructions places it in ambiguous space, unbounded, unfocused and responsive to its context and environment. In the case study described here, for example, the imposition of historical perspectives upon social, cultural, racial and natural landscapes are demonstrably influential in creating this fluidity of overt, subvert and interacting values, culminating in the imposition upon the heritage represented and its locus of existence, of inherited historical attitudes and a contemporary (but certainly not historical) environmental determinism. Thus values form and dissolve along various intersecting scales, notably including socio- and cultural-political pathways, transitions between culture and nature, and between folk mythology and high culture (cf. Fiske, 1989).

Analysis of these intersecting scales emphasises the importance of context on value creation and expression, and indicates the roles of social, political and intellectual activism, transfer of values between domains, assumptions of linearity and cyclicity in time, and the value effects of the continuing existence of heritage places. By doing so, we emphasise the otherness of cultural heritage. In this case, by identifying cultural heritage as ‘other’, we can view the multiplicity of perspectives within the intellectual context of the contested domain of otherness, the contrast between the ‘other’ (i.e. the heritage itself or its representation) and the ‘same’ (i.e. the hegemonic institution of society and its instruments of heritage management) allows us to gain an increasingly meaningful understanding of cultural heritage, the physical and cognitive places it occupies and the many meanings it may be attributed, and the relationships between these and the society which constructs them. Of course, by identifying heritage as ‘other’, if not explicitly, the dominant hegemony predefining the places also maintains control, and by the various logistic devices of legislation and bureaucratic practice, defines cultural heritage out of the ordinary, legitimising constraint (and thus itself creating cause for contest), and thus forcing the heritage into the field of ‘others’ which are ‘regarded in some way illegitimate members of society as a result of a variety of [marginal or “outsider”] social characteristics’ (Murdoch & Pratt, 1997:53-54).

As a final rejoinder, we should state, whether the specific contested domain of ‘otherness’ is truly a valid conceptualisation of the processes surrounding the definition of meaning of cultural heritage, is irrelevant here. While it provides to us a seemingly logical model of relationships, its presence more importantly stimulates a critical view point and the potential for the development of new sites of understanding (again, sensu Bhabha, 1994). As such, it offers a heuristic device which has a place both within the modernist (which should appeal to hegemonic management) and postmodernist tradition. In a modernist sense, the model of ‘otherness’ merely represents a politically unchallenging scientific hypothesis (literally a ‘defective thesis’) which may be tested and thus form the basis for further enlightenment. In the postmodernist tradition, however, the claim of ‘otherness’ provides a counter-authority stance against which to challenge and mirror reality, and therefore perhaps more potently.
affirm the need for a fundamental conceptual shift in the articulation of what is cultural heritage. In this way:

...the theoretical enterprise [which] has to represent the adversarial authority (of power and/or knowledge) which, in a doubly inscribed move,... simultaneously seeks to subvert and replace. In this complicated formulation I have tried to indicate something of the boundary and location of the event of theoretical critique which does not contain the truth (in polar opposition to totalitarianism, 'bourgeois liberalism, or whatever is supposed to repress it). The 'true' is always marked and informed by the ambivalence of the process of emergence itself, the productivity of meanings that construct knowledges in medias res, in the very act of agonism, within the terms of a negotiation (rather than a negation) of oppositional and antagonistic elements. It is to suggest that the dynamics of writing and textuality require us to rethink the logics of causality and determinacy (Bhabha, 1994: 22-23).

And so, at Beachmere, the ambivalence of a 19th century European observation of an alien land, the ambivalence of the relationship between planted alien pine trees and the soil in which they grow, the ambivalence of the late 20th century construction of Aboriginality, and more, all negotiate the meaning of the Indigenous material heritage buried in the land observed, grown upon, and assigned Aboriginal (in)significance. The meaning(s) mirror cultural processes of construction and thus by attempting to identify the ambivalences, it is possible to enculture the cultural heritage, and come some way closer to rethinking the logics of causality and determinacy.
CHAPTER 14

THE MULTI-VOCALITY OF LANDSCAPE II: “DISAGREEABLE SWAMP” OR “NOURISHING TERRAIN”?

THE VALUE OF CULTURAL HERITAGE IN MARGINAL LANDSCAPES: A SOUTHEAST QUEENSLAND CASE STUDY.

Cotter, M.M. & Boyd, W.E.
School of Environmental Science and Management, Southern Cross University, Lismore, NSW.

Published book chapter


Concept and design of research

Concept and project design Cotter

Project Supervision: Boyd

Collection, analysis and interpretation of data

Collection of data: Cotter

Analysis and interpretation of data: Cotter

Writing

Writing: Cotter

Proof reading and edits: Cotter 50%, Boyd 50%

Preparation of Tables and Graphics: Cotter (except where acknowledged in the captions)
CHAPTER 14

THE MULTI-VOCALITY OF LANDSCAPE II: “DISAGREEABLE SWAMP” OR “NOURISHING TERRAIN”?

THE VALUE OF CULTURAL HERITAGE IN ‘MARGINAL’ LANDSCAPES: A SOUTHEAST QUEENSLAND CASE STUDY.

Space is transformed and envauled from the moment it enters the social and cultural space; the cultural world familiarises physical space in a web of meanings that are not only signs of the times, but also signs of the place. It is not land that is perceived, topographised; it is territory, as owned, contextualised and continuously renegotiated space (David & Lourandos, 1999:107).

INTRODUCTION

Cultural landscapes continuously unfold in space and time as peoples relationships with their social and physical environments are built on, discovered, negotiated and unveiled (David & Lourandos, 1999). Thus an understanding of the historical and social context of peoples relationships with particular landscapes is pivotal to the assessment of the cultural values attributed to such places. This paper documents historical shifts and social biases in the cultural values attributed to a small parcel of land situated within the coastal lowlands of southeast Queensland. The reasons for such documentation are two fold. Firstly it serves as a reflection upon the way in which the continuous renegotiation of space may work to marginalise landscapes and effectively minimise cultural heritage values apparently embedded within such landscapes. Secondly, it is to highlight that cultural heritage values are, of necessity, historically contingent, dynamic and situation specific (cf. Murdoch & Pratt, 1997). In effect the case study outlined here demonstrates that cultural heritage values are fluid values and typically reflect the many historical conceptualisations of social, cultural and natural landscapes, including in this case, contemporary environmental determinism. Moreover the case study, through its examination of the cultural construction of a particular landscape – specifically a cleared pine plantation and an associated Aboriginal midden precinct – reveals that the entity that is cultural heritage is also of considerable fluidity of meaning, emphasis and acceptance. This in turn reflects the multi-dimensional character of the place within which the cultural heritage is represented and from within which it acquires value. Ultimately, the meanings attributed to cultural heritage mirror the processes of the cultural construction of that heritage. In this case study, by attempting to identify and nuance the cultural meanings of a cleared pine plantation and its associated landscape, we emphasise the importance of understanding context in the creation and expression of cultural heritage value. In this way, the repeated re-attribution of Eurocentric notions of the landscape of the study area as ‘alien’ and ‘other’ are clearly shown to provide the context by which Indigenous cultural heritage values are minimised.
LLOTS 162 & 163, BEACHMERE: THE NEGOTIATION OF CULTURAL SPACE

Using as a case study a small parcel of land situated within the coastal lowlands of southeast Queensland, this paper examines the changing and competing values that may be attributed to a place. The subject of this case study, a 129 ha parcel of land referred to as Lots 162 & 163 (Caboolture Shire Council, 1993; Maher & Associates, 1994), is situated near the coastal township of Beachmere, some 50 km north of Brisbane in southeast Queensland (Figure 14.1). The shoreline of Deception Bay is c. 650 metres to the east of the study area and the influence of coastal processes such as beach ridge formation and shoreline progradation is reflected in a topography of low relief dominated by a characteristic ridge and swale pattern, and sandy soils of low fertility. The mostly rectilinear land parcel is bounded to the south by a transmission easement servicing Mynot Road Beachmere, to the north and north west by a large Melaleuca quinquenervia swamp, and to the west by Peel Road, Beachmere (Figure 14.2). Within Lot 162, an Aboriginal midden precinct was recorded during an archaeological assessment of this area commissioned in 1994 as part of a wider environmental impact assessment of a sand extraction operation proposed for the land (Wallin, 1994; Maher & Associates, 1994). Significantly the archaeological and aboriginal cultural heritage values of this midden precinct were publicly contested within the context of a Queensland Planning and Environment Court Appeal (Harrison & Genery vs Caboolture Shire Council & ORS) in October 1995. The outcome of this litigation – a finding in support of proposed sand extraction – effectively denied the cultural significance of the archaeological remains and, in particular, devalued their importance in their contemporary landscape context. Key to this denial appears to have been interpretations which relate the quality of the Aboriginal archaeological remains (e.g. “substantially reduced integrity”, “highly disturbed”; Wallin, 1994) to the presumed environmental quality and aesthetic appeal of pine plantations, and especially, logged pine plantations (e.g. “highly degraded”, “singularly unattractive”; Amaral, 1994; Fien & Fien, 1994). We consider that this imposition of values relating to environmental quality upon the presumed values of cultural heritage in the same landscape was of central importance in denying in situ Indigenous cultural heritage values. Furthermore, this negative construction of cultural value has a much longer and more complex history than one which can be attributed solely to the relatively recent pine plantation phase. The colonial and post-colonial cultural history of this area is replete with constructed evaluations of the (frequently negative) environmental quality of the area. These evaluations combine to form a powerful – if at times internally ambiguous and/or contested – expression of a Eurocentric cultural imposition upon the meaning of the landscape in the study area.

This paper then, considers the contemporary cultural heritage values of this contested parcel of land in light of historical and social shifts in the relationships of people to the land and its surroundings. In particular the paper illustrates the complex interconnectedness of historical, Eurocentric perceptions of the lowland area as “disagreeable swamp” (Eipper, 1841a), its recent (c. 1995) status as a cleared Pinus elliottii plantation, and its current and future status as a site for sand extraction (Maher &
Central to this interconnectivity is the marginalisation of the area as “wasteland” within both colonial and post-colonial hegemonic discourses focusing on the description, discovery and purposeful use of land particularly for agriculture (e.g. Hodgkinson, 1845; Lang, 1861; Meston, 1895; Russell, 1888; Weedon, 1897). Also central is the reinforcement of this marginal status by current heritage management frameworks which focus on the management of the notional “site” as the essential locus of representation of the cultural heritage, rather than a wider, more encompassing - both physically and intellectually – ‘landscape’ (Ellis, 1994; Ross, 1996). Yet this “disagreeable” wasteland demonstrably occurs within the somewhat more fluid boundaries of an ethnographically and (more lately) archaeologically documented cultural landscape (Boyd et al., 1996; Hall, 1996), an Indigenous cultural terrain which is diverse, encompassing and nourishing, rather than ‘alien’ in its attribution (cf. Rose, 1996).

This paper highlights the juxtaposition of Eurocentric notions of ‘alien’ and ‘other’ and Indigenous concepts of ‘integral’ and ‘nourishing’ (sensu lato Rose, 1996). Drawing upon the writings of Murdoch & Pratt (1997) the term ‘other’ is used to draw notice to people, places, behaviour and/or values which are present but peripheral, marginalised, unwanted or ignored - and thus often opposed or made invisible - in traditional (and contemporary-traditional) visions of cultural heritage (Boyd &

Figure 14.1 Location map of the study area (prepared by Greg Luker, Southern Cross University).
Cotter, 1999). The juxtaposition is most succinctly demonstrated for the study area in the context of the recent environmental impact assessment commissioned to assess the then future (c. 1996) use of Lots162 & 163 as a site for sand extraction. In reality, this cleared Pinus elliottii plantation (a contemporary ‘wasted’ landscape) is attributed a more complex alien sub-text through its association -

- with the colonial ‘otherness’ of Indigenous culture and places. Moreover this newly acquired alien sub-text converges with the alien status historically attributed to the Aboriginal people of the district by their normative and cognitive associations with the ‘disagreeable’ wasteland of the nearby Melaleuca swamps. Further marginalisation of this environment is historically associated with failed attempts in the 1860’s-1890’s to establish various rural agricultural industries in the district. This

---

**Figure 14.2. Cadastral Boundaries, land-use and land-cover units for the study area c. 1987 highlighting areas planted to pine and the cadastral boundaries of Lots 162 & 163 Beachmere.**

Landuse and vegetation cover, Toorbul Peninsula, south east Queensland - 1987

Legend

- Rural residential
- Pine plantation
- Cleared / grazing
- Forest mosaic (mixed Eucalyptus associations)
- Extractive Industries
- Mixed Dune vegetation
- Melaleuca swamp forest
- Reed swamp (Baumea spp. dominant)
- Eucalyptus / Casuarina woodland

Deception Bay

0 1 2Km

---

27°04' S

27°06' S

153°04' E

153°06' E

153°08' E

Lots 162 & 163
failure of ‘marginal agriculture in marginal land’ helps to reinforce the perception of the wasteland character of this place since the potential of a tameable/habitable wasteland is seen to be thwarted by the harsh reality of the ‘disagreeable wasteland’. So too the final marginalisation of the midden (an item of Indigenous cultural heritage value), particularly within hegemonic management structures, is bound to its occurrence within a completely logged, and consequently destroyed, pine plantation. In essence the current landscape reflects the cumulative effects of the colonial and post-colonial attribution of this landscape as ‘alien’ and ‘other’, and the concomitant effects of the hegemonic control of such perceptions on the valuation, utilisation and disposal of this landscape.

**HISTORICAL DEVELOPMENT OF EUROCENTRIC VIEWS OF THE STUDY AREA AS AN ‘ALIEN’ LANDSCAPE**

The Eurocentric attribution of the study area as an ‘alien’ landscape began prior to any colonial occupation of the landscape of southeast Queensland. Indeed those mid-to-late 18th century “voyages of discovery” into the south Pacific undertaken by sailors such as Captain Wallis and Captain Cook - which culminated in the arrival of the First Fleet in to Sydney Cove in 1788 – were, in part, initiated by the British Government to find Terra Australis Incognita – a land hitherto unvisited by a European power (Warner, 1955; Williams, 1997) and consequently an unknown, alien and marginal place to all Europeans. Similarly in 1773 when the first authorised and publicly available account of Captain Cook’s first voyage on the Endeavour was published, the following description of the newly charted coastline of New South Wales - which drew heavily upon the eye-witness journal accounts of Dr Joseph Banks - provided a picture of a large, desolate, uncultivated and sparsely inhabited country.

> It is true, indeed that we saw only the seacoast on the eastern side and that, between this and the western shore, there is an immense tract of country wholly unexplored: but there is great reason to believe that this immense tract is either wholly desolate or at least still more thinly inhabited than the parts we visited...It is certain that we did not see one foot of ground in a state of cultivation in the whole country and therefore it may well be concluded that where the sea does not contribute to feed the inhabitants, the country is not inhabited (Hawkesworth, 1773 cited in Williams, 1997: 123).

Significantly these assumptions of Australia as being a vast uninhabited and alien landscape – literally a terra nullius, a land belonging to no-one – although contrary to the immediate colonial experience proved socially, politically and legally expedient and thus became a premise of the Australian legal system (Reynolds, 1987, 1996). Although cogently argued by Reynolds (1987) to be a false doctrine – and openly challenged from as early as 1836 by some in the legal fraternity (Gardiner-Garden, 1992:5) - the doctrine of terra nullius persisted as a premise of the Australian legal system until June 3rd 1992 when it was rejected by the High Court of Australia in the judgement of Mabo v Queensland (Commonwealth of Australia, 1993; Stephenson & Ratnapala, 1993). Demonstrably then, for more than two hundred years, the notion of the colonial Australian landscape as being an ‘alien’ wasteland - a marginal ‘other’ place - has been central to the European (dis)engagement with both the environment and the Indigenous inhabitants of Australia (Horton, 2000).
The first European to record specific observations of the area surrounding Deception Bay was Lieutenant Matthew Flinders during his navigation along the east Australian coastline in 1799. His diary comments and his annotated formal charts reveal his perception of the area as being a low and inhospitable landscape. For example, in describing an excursion into the hinterland of Pumicestone Passage (just north of Deception Bay), Flinders noted that:

*The country we walked through is low swampy and brushy...in the swampy parts, the surface is full of winding holes where the water lodges rendering walking both tiresome and difficult* (Flinders 26th July 1799 emphasis added, cited in Mackaness 1956: 26).

Likewise a chart of Flinders excursions, first published in 1814 (Steele, 1975:10) and later reproduced by Oxley (1825) as an insertion in his *Plan of the Brisbane River* (Figure 14.3) denotes the terrain as being “low woody land”. Similarly, upon his first visit to Moreton Bay in November 1823, John Oxley wrote:

*Our first day’s survey terminated a little above Redcliff Point. [i.e. Deception Bay]. The shores are in general low and covered with mangroves, off which extend considerable mud-flats, dry at low water...A few miles behind Red Cliff Point, to the west, the country again becomes low, and is apparently wet, but soon rises into open forest-hills. There was no want of permanent fresh water, though not in streams [cf. swamps]...(Oxley, 1825:12-13).*

The actuality of the region being an alien and unpleasant place for colonialists was demonstrated within the first year of a continuous colonial presence in southeast Queensland. After his visit to Moreton Bay in 1823, John Oxley had recommended that:

*Should it be deemed expedient to establish a settlement in Moreton Bay, the country in the vicinity of Red Cliff Point offers the best site for an establishment in the first instance* (cited in Steele, 1975:5).

Yet one year after its establishment as a penal colony (*i.e.* by May, 1825) the settlement at Redcliffe Point was abandoned for a more favourable site along the Brisbane River. A suggested reason for this evacuation was a serious outbreak of malaria due to the site being surrounded by mosquito infested swamps (Gordon, 1963) and the then held belief that “germs were transmitted by breathing bad air” and thus a move upriver would remove “the population from the supposed infected air from the coastal swamps” (Jones, 1988: 24). Other contributing factors to the early abandonment of Redcliffe Point were considered to be such things as poor soils and a lack of building timber within the area (Jones, 1988; Meston, 1895). There is a general significance too of the status of this settlement as a penal colony and the explicit containment of convicts (the ‘alien within’ colonial society) in the “alien without” of an unknown and unpleasant place. This is especially so since the penal settlement
established at Moreton Bay was for recidivist convicts – some of the most undesirable of colonialists (Russell, 1888; Weedon, 1897).

Figure 14.3. John Oxley’s plan for the Brisbane River as it appeared in Geographical Memoirs on New South Wales Field (1825). Note annotation of “low woody land” for the Toorbal Peninsula area in the inset portion of the plan. Original image courtesy of the Fryer Library, University of Queensland.

A further example of the Eurocentric attribution of the colonial landscape of Deception Bay as alien and unpleasant comes from the account of the Reverend Christopher Eipper of events noted to have occurred during a journey he undertook to visit the natives of Toorbul in August 1841:

WEDNESDAY AUGUST 4 – The next morning...after about one mile’s walk we saw the bay [Deception Bay] again, and were told that now our way would lead along the sandy beach to Toorbal. The bay assumes , with the promontory of the old settlement to Toorbul, a semi-circular shape..... About noon, after reaching the north corner of the bay we turned westward, and soon met the lady of his majesty the King of Toorbal employed in digging dangum [the root of the swamp fern Blechnum indicum]... We then went still
westward, and were saluted by a number of women, engaged in digging dangum, after
having crossed a very disagreeable swamp well nigh a mile long (Eipper, 1841a:10).

Writing of a similar journey Nique and Hartenstein (1841:27) – both colleagues of the Reverend
Eipper - also make mention of difficulties in traversing swampy land stating:

_We continued our journey, and crossed the Deception River [i.e. Caboolture River]...As
we passed through the swamp to Toorbal we both fell into the water, which afforded not a
little amusement to the natives._

These two brief accounts of the visit by German Missionaries to the study area also alerts us to the fact
that from the outset of European engagement with this area the attribution of this landscape as an
‘other’ place was aligned to its inhabitance by ‘savages’. For Moreton Bay this complex attribution of
an ‘other’ place inhabited by ‘other’ people, as elsewhere in colonial Australia, had its origins in those
ideas and attitudes towards hunter-gatherers and village dwelling agriculturalists – ‘savages’-
developed in 17th and 18th century Europe (Woolmington, 1988; Reynolds, 1989). As part of their
cultural baggage colonialists brought to Australia numerous preconceived ideas of ‘savages’ such that
they could be noble or base and degraded. As Reynolds (1989:97) puts it, “behaviour towards
Aborigines, public and private, was intimately connected with the images of the Aborigines embedded
in European thought”. In this manner, for reasons both humanitarian and political, official Government
policy during the establishment of the penal settlement at Moreton Bay reflected a desire to have and
maintain ‘amicable’ relationships with Aboriginals. Thus the text of a letter of instructions written on
behalf of Governor Brisbane to the first Commandant of the penal settlement at Moreton Bay begins:

_His Excellency requests your attention to the following instructions ... In order to insure
an amicable understanding with the Black Native,, good faith must ever be your guide, in
your public dealings with them. Private injuries towards them must be repressed with
care; and if a public or private wrong cannot be avenged by law, it must be repaired by
compensation to the sufferers. All uncivilised people have wants, which can be cheaply
and honorably gratified by us; and when treated justly, they acquire many comforts by
their union with the more civilised. This justifies our occupation of their lands. It should
be your chief object therefore to cause justice to be done, on all possible occasions; and
when you may happen not to be able to remove all the occasions of differences, this
unavoidable evil should be lessened by increased liberality (Private Secretary J. Ovens, to
Lieutenant Henry Miller 29th August 1824, cited in Steele, 1975:4-5)._  

However, as numerous scholars have reported, throughout colonial Australia government policies of
amiability and kindness towards Aboriginals were frequently thwarted by actual colonial experiences
(e.g. Broome, 1982; Johnston, 1988; Lippman, 1991; Reynolds 1987, 1989; Ryan, 1981;
Woolmington, 1988). Indeed the likelihood of such breakdown within Moreton Bay was
foreshadowed by an incident on Bribie Island (at the subsequently named Skirmish Point) during the
brief visit of Matthew Flinders to Moreton Bay in 1799. In this incident a spear was thrown by an
Aboriginal man at some of Flinders’ party as they rowed away from the shore, and in response to this
“impudent and wanton attack” Flinders fired upon the spear thrower at least twice. Events subsequent to this initial skirmish were reported as follows:

As this very wanton attack had unfortunately obliged the party to fire upon these people, in order to maintain that superiority which they meant on all occasions to assert Mr Flinders thought it might be the means of preventing much future mischief, to give then a more extensive idea of his power, and thereby deter them from any future attempt ... he was well satisfied of the great influence which the awe of a superior power has in savages, to create respect, and render their communications with each other friendly ...

In this view, with two musquet balls in his gun, he fired at a man who was looking at them from among the trees ... (Collins, 1798-1802:499 et seq. cited in Mackaness, 1956:16-17).

If such an account presented the Aboriginals of Moreton Bay as potentially hostile, always inferior savages, it was soon reinforced by the alien descriptions of ‘native’ society provided by three castaways Thomas Pamphlet, John Finnegan and Richard Parsons who spent several months during 1823 cohabiting with aboriginal clans in Moreton Bay (including those clans in and around Deception Bay). For example in Uniake’s narrative account of the aftermath of a fight witnessed by Finnegan, ritualised cannibalism is recounted with some displeasure:

Just before dark I saw a large crowd approach, who (it seems) were bringing the bodies of the two men who had been killed. They laid them down ...and began a great lamentation over them. The first body was completely flayed, but they had not yet had leisure to skin the other ... Two large fires were lighted where the bodies lay, in which, as I judged from the noise, as well as the offensive smell, they were both consumed (Uniake 1825:26-86).

Moreover such interpretations were reflected in initial government directives for the penal settlement. Thus upon deciding to move the Moreton Bay penal settlement from Redcliffe Point to a place further upriver, Governor Brisbane (cited in Steele, 1975:5) instructed Oxley to select a new site which “to difficulty of attack by the natives, it ought to join difficulty of escape for the convicts” intimating that there was a presentiment of siege both from within and without for the initial colonialists of Moreton Bay.

In his assessment of race relations throughout the eighteen year period of penal settlement in Moreton Bay, Evans (1992) maintains that although this sense of foreboding diminished it did not entirely vanish. Thus in 1839 convicts assigned to a surveying party north of Brisbane town were ‘afraid to venture out of sight of their tents for fear of aboriginal attack’ (Evans, 1992:12). Likewise, as the following extract from the Colonial Observer illustrates, attempts to ‘civilise the natives’ were frequently thwarted by fears as to the personal safety of missionaries:

The brethen Wigne and Hartenstein returned today unexpectedly from the Ninge Ninge, where they had intended to stay for a month or two. The tribes had so much quarrelling
with one another, and shed so much blood, that they thought it no longer advisable to stay amongst them (Eipper, 1841b:51).

This and other reportage (e.g. Simpson, 1845 cited in Langevad, 1979:19) of the failure of these early missionaries to cohabit with and civilise the Aboriginals, in turn, enhanced the perceived dangers for all of going beyond the boundaries of the Moreton Bay penal settlement - where the alien landscape and its inhabitants were uncontrolled and irredeemable. It is further recognisable that the documents produced by these early missionaries and their colleagues (e.g. Atkins, 1859) both reflected and reinforced negative preconceptions of the landscape; and its Indigenous inhabitants. Indeed, as the following extract highlights, their documents often reflect a coalescence of negative preconception and unfavourable experience such that at times the negative sentiment was both authoritative and extreme:

Whether the physical or the moral condition of these children of the forest is considered, the picture they present is one of gross darkness and misery….the testimony of Scripture, that “the dark places of the earth are full of the habitations of cruelty” finds in their case an awful verification (Eipper, 1841c cited in Steele, 1975: 287).

However it is important to note that this extreme negativity of sentiment towards the Indigenous inhabitants of Moreton Bay was not universal. For example, in 1844 G.K.E. Fairholme writing from his home “Tulburra” in Moreton Bay stated that:

The blacks about our country are generally 5ft 8 inches in stature: many however are taller and very strong and well made, especially those on the sea coast... Their features are good and very pleasing...(cited in Love 1984: 96).

Likewise in a letter dated 29th of April 1845 Charles Arthur, writing from Durundur Station Moreton Bay to his father William in Laurvig Norway, comments that his brother Davie:

Considers the blacks as the hereditary owner of the soil and that it is an act of injustice to drive him from his hunting ground...The result has been that the blacks here appear to have acquired some idea of the rights of property, and this tribe, so far from doing any injury, are of the greatest assistance in procuring bark, breaking up ground with the hoe, carrying rations to the sheep stations etc etc...(cited in Caboolture Shire Council, 1979:13).

Significantly, David Archer established Durundur Station in 1841. This was the first run in the vicinity of the study area and at the time of its establishment it was the most northerly run in Australia. It was established some months prior to Governor Gipps proclaiming much of the coastal land to the north of Brisbane for the Aboriginals (Caboolture Shire Council, 1979). Although this proclamation aimed to preserve Bunya pines and associated Indigenous rituals it was principally enacted because in 1842 the land set aside as Aboriginal Reserve was not considered good land for grazing and had not been taken up in pastoral runs (McArthur, 1978). Once again an example of the characterisation of this coastal lowland as wasteland; marginal for agriculture and hence best left to be inhabited by ‘savages’.
Nevertheless, as the 19th century progressed, within colonial Australia both description and depiction of the deterioration and imminent demise of the Aboriginal people became rife. Thus, for example, in 1880 page one of the *Bulletin* ran with the words:

*It is too late to talk of preserving the aboriginal race. It is and always was Utopian to try and Christianise it. Rum and European clothes have ruined the people who half a century ago were temperate and naked. The aboriginal race is moribund. All we can now do is to give an opiate to the dying man, and when he expires bury him respectfully* (cited in Johnson, 1988: 96).

In a similar fashion, when writing with particular regard to the Aboriginals of Queensland, Thomas Weedon (1897:11) wrote: “The fate that awaits all savage peoples is overtaking them, and a few generations at most must see the end of the race”. Likewise in advocating a new and isolationist Aboriginal Reserve policy for Queensland, Archibald Meston stated:

*Even acceptance of the “doomed race” theory can in no way absolve a humane and Christian nation from the obligations they owe to this helpless people, or our solemn duty to guide them kindly across the period which spans the abyss between the present and the unknown point of final departure...* (Meston, 1896, cited in Johnson, 1988: 113).

So too during the late 1800’s Dr Joseph Bancroft began to photograph Indigenous people within southeast Queensland. In the context of this discussion his portraits of Aboriginal groups within Moreton Bay are significant because they convey, at times, a marginal “shanty town” status for these groups. Furthermore this marginal status is associated with a clear proximity to, and utilisation of, paperbark swamps such as exist in Deception Bay (Figures 14.4 & 14.5). The further characterisation of these swampy places as wasteland thus becomes enmeshed with the seemingly inevitable demise of those indigenous inhabitants that utilise such places. In essence the coastal lowlands of northern Moreton Bay are both described and depicted as a marginal landscape that is only capable of providing for a marginal people; a provision that is only necessary until the quite imminent decline of these people occurs, at which time these swamps and related land systems will have even less utility.

These late 19th century descriptions of Aboriginals were influenced by social Darwinian theories which placed Aboriginals at the lowest scale of humanity, and therefore, doomed to die out in a struggle for existence with a superior white race (Reynolds 1989). These views are still reflected today in two 20th century monuments erected within the Deception Bay area. The first of these is situated near the township of Ningi, on the south western side of the Caboolture to Bribie Island road. The inscription on this monument reads:

*In memory of
KAL-MA-KUTA
Last of the Joondoburri Tribe
Who passed away A. D. 1897
Honoured and respected*
By all who knew her.
This Memorial erected by
Caboolture Historical Society
1962.
(Tutt, 1977: 46)

The second monument is located at the Redcliffe cemetery. Jones (1988:34) reports that a grave monument at this cemetery is inscribed with the words: “A tribute from Woody Point friends to the memory of Sammy Bell (Boama) who died February 2nd 1913. The last of his tribe”. More significantly these views have featured in recent local histories (e.g. Caboolture Shire Council, 1979; McArthur, 1978). Thus when writing of Pumicestone Passage Kathleen McArthur writes:

Conflicting opinions on the definition, naming and boundaries of the tribes of south-east Queensland are still being propagated. Does it matter what names we give them now? They are gone and naming them will not bring them back. The last of the Ningi Ningi people, Kherwalli, died in 1900. The last of the Joondoburri...was Kal-ma-kuta... (McArthur 1978:48)

Implicit in these monuments - and the seemingly tacit acceptance of the truth of their inscriptions by contemporary local historians - is the view that the Indigenous population of Deception Bay, and any associated cultural landscape, no longer exists. In light of recent Native Title Legislation (Native Title Tribunal, 1999) the truth of such a view a mere twenty years after its authorship seems problematic. This is particularly so since during the contestation over the cultural heritage values of Lots 162 & 163 during 1994 three separate Indigenous groups claimed an ongoing tribal affiliation with the landscape of Deception Bay (Boyd et al., 1996). Nevertheless the popular expression of such a view in the late
20th century, however doubtful its validity, adds a further complexity to any consideration of the contemporary negotiation of cultural space within Deception Bay. It is clear that there is a cultural fluidity in the attribution of people to place. Thus in the hegemonic framework of McArthur (1978) although Aboriginals remain as the “other” they are now - due to their inevitable demise – clearly alienated from the contemporary landscape. This view of the “alien” contrasts markedly with that supporting the previous colonial hegemony in which Aboriginals were closely linked to a remarkably alien landscape. As revealed below an essential element of the Eurocentric attribution of the notion of “alien” to the landscape and Indigenous inhabitants of Deception Bay has been the ongoing search for a value – and primarily, an economic value - for that landscape.

Figure 14.5. Photograph of Aboriginal groups Stradbroke Island, Moreton Bay ca: 1894. Note the paperbark huts and the Melaleuca swamps in the background. From the Bancroft Collection., photograph (negative 62940) courtesy of the John Oxley Library, Brisbane, Queensland.

“THE TAMING OF WASTED SPACE?”

Upon the cessation of the Moreton Bay penal settlement in 1842 the declaration of Aboriginal Reserve over the coastal lowlands, including northern Moreton Bay, meant that these areas remained relatively unexploited and largely alien to Europeans for a further twenty years. However, soon after the declaration of the new Colony of Queensland in 1859, these Reserves were revoked by the Unoccupied Lands Occupation Act of 1860, and there began a phase of regional expansion and experimentation with agricultural pursuits. This was in accord with the general sentiment applied to the new colony of Queensland at this time - the Reverend Dunmore Lang (1861) for example titled a
book; *Queensland Australia; A highly eligible field for emigration, and the future cotton – field of Great Britain: with a disquisition on the origin, manners and customs of the Aborigines.*

Not surprisingly, one of the first agricultural enterprises attempted within the district was the Caboolture Cotton Company. This company was established in 1861 about 10 km west of the study area on the banks of the Caboolture River (Caboolture Historical Society, 1973). As reported below, this experiment with the growing of cotton suffered the effects of weather extremes including floods and hailstorms and coupled with unsuccessful Petition to the Government for a freehold grant of land (to make the pursuit viable) it ceased operation within about 10 years of its commencement (Caboolture Shire Council, 1979):

*Then there is the Caboolture Cotton Company whose plantation is not far from Brisbane, situated on a small river running into Moreton Bay. This was wild bush land and the labour of clearing has been considerable ... This company also suffered severely from a hail storm shortly after the 'plants' appeared above the ground and a second planting was rendered necessary ...* (The Guardian 15th February 1862, cited in Caboolture Historical Society, 1973: 21).

Likewise sugar cane farming & rum distilling were attempted in the same area, and also at Toorbal Point (Caboolture Historical Society, 1977) but were similarly unsuccessful due to winter frosts, lack of sufficient water and failed Petitions (Caboolture Shire Council, 1979). The demise of these early agricultural pursuits is reflective of the general difficulties encountered in the early European quest to attribute value to this landscape. In this regard some notes on Thomas Edwin Bonney an early dairy farmer in the study area provide salient example. Bonney was established on “Toorbal Station” in 1868 and in Department of Land Records for 1869 he is recorded as the first official owner of a 3000 acre land parcel (known as the Bribie Section or Bonney’s Run) which included that land later divided to become Lots 162 & 163 (Caboolture Shire Council, 1979; Wallin, 1994). Writing in November 1868 Bonney refers to improvements to his land including the erection of huts, stockyards, milking sheds and dairy. Two years later, all of the Bonney’s buildings were washed away by floods (Caboolture Shire Council, 1979).

Similar difficulties with floods were reported for other settlers to the area. For example in 1887 a Mr Millman commenced a dairying enterprise at Beachmere and subsequently he and a neighbour initiated a small cheese-making factory. Although these pursuits were moderately successful, the isolation of these properties due to the swampy nature of the area was clearly debilitating at times:

*At that time the only people the Millmans saw were those who went to the beach in fine weather for picnics. The road then was a narrow track through a swamp and it needed a careful driver to get through safely to Beachmere. During the 1890 floods the roads were impassable and the Millman family saw no one but their workmen and Mr Holbrook for seven months* (Caboolture Shire Council, 1979: 140).
Heinrich Bestmann obtained an agricultural farm lease over the immediate study area in 1899 and from then until the late 1960s Lots 162 & 163 remained part of his predominantly dairying and honey producing property (Caboolture Historical Society, 1973; Caboolture Shire Council, 1979). At this time A.P.M privately developed slash pine (*Pinus elliottii* Engl.) plantations within the Beachmere area (Macarthur, 1978; Mann, 1990; Hall et al., 1991) and subsequently Lots 162 & 163 were planted to pine. Significantly, in the context of taming the landscape through agriculture, *Pinus elliottii* is noted to be the preferred exotic pine species for planting within the coastal lowlands of southeast Queensland because of its wider tolerance of shallow, poorly draining and low fertility soils (Pegg, 1967; Francis, 1984). Moreover, despite the fact that exotic pine plantations had been established on the coastal lowlands of Queensland since the mid 1920s (Bevege, 1972; Francis, 1982; Francis & Bacon, 1983; Ryan, 1990), they were not established at Beachmere until the late 1960’s. In essence, both the use of *Pinus elliottii* and the later establishment of plantations around Beachmere relative to other places in southeast Queensland suggests that this area (and hence Lots 162 & 163) remained at the margins of utility, even proving problematic for an agricultural pursuit best-placed to exploit marginal coastal land.

Nevertheless, prior to the logging of Lots 162 & 163 in 1994 it is evident that the sub-mature pine plantations develop for the residents of Beachmere values which can be attributed a status akin to those of an ordered woodland (*Sensu* Rackam, 1994). It thus becomes a recreational zone for horse and trail-bike riding and is commented on for the quantity of birds that it attracts (*cf.* Smith, 1987). Moreover it increasingly develops those qualities frequently associated with wildwoods hence, as noted first hand; the plantation becomes a place for the indiscriminate disposal of large items of waste including car bodies and horse carcasses. Thus the premature removal in 1994 of the pine plantation as a result of asset liquidation, the subsequent transfer of land; and the pursuit of extractive resource approval were met with dismay from local residents who perceived an immediate reduction in amenity from the newly scarred landscape, a reduction in fauna and flora habitat; and the impending extractive resource processes. Theirs is clearly a placement of value on the extant plantation not as it is once logged. This positive valuation of the extant plantation by local Beachmere residents is much in contrast with the values placed on pine plantations in the Tumut region as discussed by Lane (1997a, b, & c) and highlights the fact that environmental values, like heritage values are, of necessity, historically contingent, dynamic and situation specific.

Before proceeding to the evidence that situates the swampy environs of Deception Bay within the “nourishing terrain” of an Indigenous cultural landscape I wish to highlight one other economic pursuit undertaken in the early years of European exploitation of northern Deception Bay. During the 1860’s lime-burning was carried out by Mt Thomas Tripcony along the shores of Deception Bay (McArthur, 1978). The lime was sold to James Campbell & Sons of Brisbane for use as fertiliser and as an agent in mortar used for the construction of early buildings in Brisbane (McArthur, 1978).
Significantly the source of lime was the many Aboriginal shell middens forming banks along the Deception Bay shoreline. This exploitation of Aboriginal shell middens for use as construction material in the 1860’s highlights how de-valued these material culture remains were at this time. There is a certain irony in the 1990’s devaluation of the same material culture remains so that underlying dune sands can be extracted for use as construction elements in current urban development projects.

**THE STUDY AREA AS A “NOURISHING” INDIGENOUS CULTURAL LANDSCAPE: THE EVIDENCE**

In contrast to the above Eurocentric depictions of a marginal, inhospitable and infertile landscape, the local Aboriginal archaeological record of northern Deception Bay features a diverse range of site types (Figure 14.6). These include: a ceremonial bora ground (Flood, 1990; McArthur, 1978; Satterthwait & Heather, 1987), a possible stone-fish trap (Stockton, 1975; Walters, 1985), the well documented Sandstone Point midden complex (Hall, 1999; Hall, *et al*., 1987; Nolan, 1986), a possible plant processing site at Browns Road (Richter, 1994) and numerous undated shell middens (Hall, 1982, 1996; Stockton, 1979). Jointly this archaeological evidence indicates that during the past, and especially during the last 2000 years or so, this area was an Indigenous cultural landscape of considerable symbolic, social and economic meaning and activity.

![Figure 14.6. The location of known Indigenous archaeological places within northern Deception Bay (after Hall with Cotter, 1996).](image)

The Aboriginal archaeological evidence for the symbolic, social and economic importance of Deception Bay is further supported by much ethnographic evidence. Of particular importance are the previously noted accounts of the three castaways Pamphlet, Finnegan and Parsons who spent several months cohabiting with Aboriginal groups including the Ningi Ningi of Deception Bay during 1823.
As already described, Uniake (1825) presents a detailed narrative account of a “fight among the natives of Moreton Bay, witnessed by John Finnegan” in November 1823. This fight occurred at a ceremonial ground within the tribal lands of a clan “five and twenty miles” to the south west of the “natives at Pumicestone River” (resident at this time at Toorbul, the northern peninsula of Deception Bay) and thus the ground can be interpreted to be at least in the vicinity of the Redcliffe Bora Ground (Steele, 1972:77). The following extract from Uniake relates events subsequent to the death of two of the Pumicestone River clan during this fight. In this context it is significant since, when scrutinised, it points towards the physical association of Indigenous mortuary practices with the environment surrounding the Beachmere area:

Just before dark I saw a large crowd approach, who (it seems) were bringing the bodies of the two men who had been killed. They laid them down ... and began a great lamentation over them. The first body was completely flayed, but they had not yet had leisure to skin the other ... Two large fires were lighted where the bodies lay, in which, as I judged from the noise, as well as the offensive smell, they were both consumed. Immediately after this our whole party decamped; and having travelled more than half a mile, we stopped for the night. Very early next morning we again started, and travelled all day with great expedition, without ever halting or eating anything ... I had observed, during this day's march, two men, ... each of whom carried something on his shoulder, but did not keep the same path with us, walking through the bush at a little distance abreast of us...We travelled that day about eight or ten miles, and towards evening arrived at the edge of a large swamp, where we halted, and huts were instantly erected by the women who were obliged to go out and procure fern root for the whole party...I lodged as usual with the chief, at a little distance from whose hut I observed the two men hang up their burthens... Uniake (1825:78-81)

Finnegan's placement of this large swamp about ten or so miles from a camp likely to have been adjacent to the Redcliffe Bora Ground (Steele, 1972) suggests that this swamp is the large wetland area due north of Lots 162 & 163, and adjacent to Austral Road Ningi (Figure 14.2). This interpretation is based on the expectation that the Pumicestone River people, mourning the death of two of their party, did not walk south or west into the territory of the people with whom they had been in battle, but that they retreated north towards their clan territory at Toorbul. Lending support to this evidence are personal observations of midden and artefactual material located on the sand dunes immediately to the east and southeast of this wetland area; at the very least it is a swamp land which at one time or another has been traversed by Aboriginal people. Moreover, the archaeological site identified by Wallin (1994) in Zone A of Lot 163 is situated on the most immediate and most substantial dune to the southeast of this wetland area. In this context it might be considered analogous to the short duration “dinner-time” camps referred to by Meehan (1988). It should also be stated that the “expeditious” nature of the grieving aboriginal party's trip to the wetland campsite suggests that it was a purposeful journey, that is, it was the specific intention of the group to arrive at this wetland campsite. In this respect the abundance of fern root within the swamp may have been of considerable importance since it offered an abundant, readily obtainable food resource during a time of grief and/or clan distress.
Uniake goes on to narrate that the Pumicestone River clan remained beside this swamp for two days. Throughout this time a fire was maintained underneath the place where the two *burthens* – which Finnegan with much persistence ascertained contained the skins of the two men who had been killed during the fighting – had been hung. On the evening of the second day at this campsite Finnegan witnessed what were clearly the final funereal rights of the two deceased:

*Shortly afterwards, all the men dressed themselves in kangaroo skins, and one of them in an old rug jacket which I had, and with one or two women, held a consultation round the fire, each person having a fire-stick in his hand. After conversing about half an hour, two of the party separated from the rest, and having taken down the skins, set off at full speed through the bush; the rest followed, shouting and making much noise. After this I saw nothing more of the skins, nor do I know what became of them. In about three-quarters of an hour the party returned. The next morning we returned to the Pumicestone River and the natives followed their usual occupations as if nothing had happened* (Uniake 1825: 78-81).

If the mortuary practices surrounding this incident can be determined to have occurred within the immediate locale of Beachmere, then the activities surrounding the final placement of the skins of the deceased must have occurred within a short distance of the described campsite. If these conclusions are correct, then the historical evidence indicates that the Beachmere area was of significant social and ritual importance to the local Aboriginal people. Importantly, the significance of social and ritual activities in the life-ways of the Aboriginal people of Deception Bay has been elsewhere confirmed. In the diary comments of Nique and Hartenstein (1841:27), for example, recorded during a journey to Toorbul, they state with some incredulity that:

*Afterwards they dressed themselves for battle, requesting us to accompany them to look at it... When we arrived at the field of battle we saw, to our great surprise, that there were nearly two thousand men, women and children assembled.*

There is also apparent in Finnegan’s description of the movement of the Ningi Ningi clan throughout Deception Bay, the clear indication that this clan functioned within a familiar ‘cultural landscape’. Moreover, the notion of the Ningi Ningi clan following pathways and returning to places along them as described by Finnegan suggests a conceptualisation of the interrelationships between and within sites by this clan. This is reinforced by the discussions of Satterthwait and Heather (1987) who emphasise the complex interplay between social, cultural and environmental factors that operated to determine the form and, in particular, the location of Bora Grounds such as occurs at Redcliffe and Toorbul.

In addition, Finnegan’s account highlights the central economic and social importance of the swampy environs of Deception Bay within this conceptualised network. This central social and economic importance of the swampy environs of Deception Bay is also corroborated by comments by other observers including Tom Petrie who recalled that the natives got the root of a fern which grew in the swamps in great quantities.
It was mostly the gins who dug this up and put it in their dillies to carry it back to camp; great loads of it there would be at times, for the root was highly esteemed (Petrie, 1992:92).

Likewise Uniake in reporting his own observations of the huts of Aboriginals observed on Bribie Island indicates the utility of the Melaleuca swamps to the Aboriginal people of the area.

Their huts are built of long slender wattles, both ends of which are stuck into the ground, so as to form an arch about three feet and a half or four feet high. These are strongly interwoven with rude wicker-work, and the whole is covered with tea-tree (Melaleuca armillaris) bark in such a manner as to be quite impervious to the rain: thus forming a spacious and commodious hut, capable of containing from ten to twelve people (Uniake, 1825: 78-81)

A similar description is provided by Backhouse of the Aboriginal huts he observed in 1836 upon a visit to Stradbroke Island:

We walked to a native village on the coast. It consisted of a number of huts, formed of arched sticks, and covered with tea-tree bark so as to form weather-tight shelters, just high enough to allow the inmates to sit upright in them...at the outside there were little fires, at which many of the women were roasting fern-root. This after it was roasted, was held by a stone held in the other hand, so as to break the woody fibre. In this state it is eaten without removing the charred surface; its taste is something like that of a waxy potato, but more gelatinous (Backhouse 1843: cited in Johnson, 1988:9)

Moreover it is these same huts which are depicted in many of the photographs of Aboriginal groups taken by Dr Joseph Bancroft within Moreton Bay in the late 1800s (Figures 14.4 & 14.5). Thus, rather than merely depicting the Eurocentric view of a marginalised people at the margins of habitable land, these photographs also depict the maintenance and endurance of Indigenous links to the swamps of Moreton Bay throughout the Century. Consequently within Deception Bay “disagreeable swamps”, sand dunes and middens can be assumed to be of cultural significance each being unique components of an Indigenous ‘cultural landscape’. Furthermore it is the spatial and temporal interconnectivity of these components that remains central to the construction and maintenance of this cultural landscape:

I’ve been brought up feeling very strongly for where I come from and when it come to places of – like ceremonial places and gathering places, places such as that which were always important to my ancestors, it is important to me too (Bond, A. 1995).

PINUS ELLIOTTII PLANTATIONS AND THE SUBVERSION AND RE-ATTRIBUTION OF ‘ALIEN’ LANDSCAPES

Throughout 1995 the predominant features of Lot 162 & 163 were the remains of a recently cleared exotic Pinus elliotti plantation and an associated newly emergent vegetation cover dominated by weed species such as Pytollaca octandra --- elsewhere noted to be an initial and exclusive coloniser of the windrows associated with pine plantations (Smith, 1987) ---, as well as by Pteridium esculentum and some grass species (Figure 14.7). Along minor drainage channels, particularly in the southeast dense stands of Melaleuca quinquenervia and Casuarina glauca were also visible. In addition an Aboriginal midden precinct occurs within Lot 162 (Cotter, 1995; Wallin, 1994).
During 1995 consideration of the cultural, archaeological and scientific significance of the midden precinct in Lot 162 was a feature of a Queensland Planning and Environment Court Appeal initiated by Beachmere residents in response to a favourable Environmental Impact Assessment of a sand extraction proposal for this land parcel (State Reporting Bureau, 1995). It is not the purpose of this paper to comment directly upon either the EIS process nor upon the litigative process. Elsewhere we have examined the relationships between the stakeholders in this litigation (Boyd et al., 1996). There we drew upon social construction theory (Jackson & Penrose, 1993) to develop the notion of “cognitive ownership” and thereby focused attention on the diversity of socially-constructed values identifiable for any cultural place. In essence “cognitive ownership” represents for us the link(s) between people and place defined by some constructed meaning(s), some expression of intellectual, conceptual or spiritual value(s) and articulated through a sense of the landscape within which the place has value. Thus far in this paper we have examined the historical development of the negative valuation of this landscape by Europeans and examined the Indigenous counterpoint to these negative views. In this final section of this paper we will consider the way in which the contemporary aesthetic; and the site based approach to cultural heritage management has acted to re-affirm the marginal status of this landscape, and minimised the value of any Indigenous cultural heritage it contains.

Figure 14.7. Photograph of Lots 162 & 163 taken in 1994 subsequent to pine plantation removal. Note the weeds, burnt stumps and general lack of aesthetic or environmental appeal of the Place.
THE CONTEMPORARY AESTHETIC

Within the framework of the Environmental Impact Assessment for Lots 162 & 163 (Maher & Associates, 1994) scientific experts were drawn to make statements as to the aesthetic. Thus a soil scientist commented that:

*The site has been cropped with Pinus eliottii for 30 years and as result, has been severely degraded* (Amaral, 1994:6).

And went on to state that:

*the land surface was littered with stumps, roots, undersized trees, branches and remnants from various woodchipping activities* (Amaral, 1994:6).

In a similar fashion a couple of ornithologists wrote:

*The site is singularly unattractive, having been left in that state after the harvesting of the exotic pines* (Fien & Fien, 1994:3).

Thus it can be concluded that the lack of a pleasing aesthetic within lots 162 & 163 contributed to a devaluation of the landscape in its post-logged state. This in-turn contributed to the devaluation of the Indigenous material culture remains, primarily because it was considered to be disturbed (although the level of disturbance was disputed at Court). Moreover in the context of the perception of disturbance, a site-based rather than a landscape - based cultural heritage management strategy (Ellis, 1994, Ross, 1996) is apt to de-value a ‘disturbed’ midden, situated in an aesthetically unappealing place if other middens occur elsewhere. In the context of Beachmere this would clearly deny the value of the spatial interconnections between places in the landscape identified from the archaeological and ethnographic evidence.

CONCLUSIONS

This study reveals that several changes in land cover and land use within the study area have, both actively and passively, subverted and challenged the hegemonic concept of ‘alien’ landscape. For example in the first years of the Moreton Bay penal settlement Aboriginals are intimately associated with the Eurocentric view of the place as inhospitable and alien. However, as social Darwinism develops in the mid to late 1800s the Eurocentric view becomes to consider that the Aboriginals are a doomed race and hence it is the Aboriginals who are to be inevitably alienated from the landscape.

The most significant challenge to the hegemonic concept of alien landscape is however best illustrated by the regional development of *Pinus elliottii* plantations within the Beachmere area during the late 1960’s and early 1970’s. Through the development of pine plantations, low swampy land --- “unpleasant wasteland”, historically described as “disagreeable” (Eipper, 1841a:10) and “ tiresome” (Flinders, 1799; cited in Mackaness 1956:26), and consequently attributed low economic, social and amenity values --- is actively reclaimed as agricultural land and thereby attributed new and central economic value. Ironically, this active subversion of the previously dominant concept of ‘alien”
landscape (through the controlling medium of agriculture), is increasingly challenged by the growth of uniform stands of pine trees and their subsequent evolution into spaces of “ordered woodland”. This passive development of an “ordered woodland” reinvests the landscape with social, amenity and recreational values frequently attributed to wild “alien” areas (“wildwood”). Yet these attributed values are bounded within agriculturally-defined settings and thus the alien nature or “otherness” of such ‘wild’ pine plantations contrasts markedly with the concept of “otherness” attributed to the pre-agricultural landscape. Furthermore, the recent clearing of immature stands of pines (because of corporate asset liquidation and urban development pressures) within the study area create a newly alien “scarred earth” landscape (“damaged / unnatural woodland”) which is in contrast to and supplantive of the pre-existing “ordered woodland” of the extant pine plantation. Ultimately this repeated re-attribution of the concept of ‘alien’ landscape reflects the spatial and temporal fluidity of the social construction of landscape, constructions which are then imposed upon the values of the cultural heritage represented within that landscape. In the case of the midden precinct situated within Lots 162 & 163 Beachmere historical contingencies, the dynamism of negative perceptions and the specifics of its contemporary situation meant that in 1995 it probably ‘didn’t stand a chance’ of surviving as an in situ item of cultural heritage in development prone southeast Queensland.
CHAPTER 15

THE MULTI-VOCALITY OF LANDSCAPE III: THE CONTESTED CULTURAL LANDSCAPE OF DECEPTION BAY SOUTHEAST QUEENSLAND IN WIDER CONTEXTS

“RIGIDITY AND THE CHANGING ORDER...DISORDER, DEGENERACY AND DAEMONIC REPIETION” FLUIDITY OF CULTURAL VALUES AND CULTURAL HERITAGE MANAGEMENT.

Boyd, W.E., Cotter, M.M. Gardiner, J.E. and Taylor, G.

Published book Chapter


Concept and design of research

Concept: Boyd 50%, Cotter 30%, Gardiner 20%

Project Design: Boyd 50%, Cotter 30%, Gardiner 20%

Collection, analysis and interpretation of data

Collection of data: Boyd 30%, Cotter 30%, Gardiner 25%, Taylor 15%

Analysis and interpretation of data: Boyd 30%, Cotter 30%, Gardiner 25%, Taylor 15%

Writing

Writing: Boyd 50%, Cotter 30%, Gardiner 10%, Taylor 10%

Proof reading and edits: Boyd 50%, Cotter 40%, Gardiner 10%
CHAPTER 15

THE MULTI-VOCALITY OF LANDSCAPE III: THE CONTESTED CULTURAL LANDSCAPE OF DECEPTION BAY SOUTHEAST QUEENSLAND IN WIDER CONTEXTS

“RIGIDITY AND THE CHANGING ORDER…DISORDER, DEGENERACY AND DAEMONIC REpetition”: FLUIDITY OF CULTURAL VALUES AND CULTURAL HERITAGE MANAGEMENT.

A START: CULTURE HERITAGE AND HUMAN BEHAVIOUR

Human beings bring complexity to any situation: the derivatives of human behaviour, cultural values and social behaviour may then be reasonably expected to have enhanced complexity. The consequential representation of these values and behaviour must therefore be expected to be diverse and complex. In this discussion, these consequences are the representations of the cultural past through the medium of cultural heritage. With the emergence of multicritical analyses of society and culture, a traditional view of a single history becomes increasingly untenable and open to contest.

In recent years, the issue of a multi-critical, multi-vocal, and connected past has been amplified in various disciplines and contexts. Tuan’s observations on human nature and behaviour, for example, extend, in his view, beyond the personal to social and cultural scales (Tuan, 1974, 1977), hinting at multi-vocality and contest: “people sometimes behave like cornered and wary animals …[but] may also act like cool scientists…neither posture hold[ing] sway for long…. The human person…is animal, fantasist, and computer combined….” (Tuan, 1977:5). In a more direct heritage context, Lavine and Karp’s (1990) assessment of museum exhibition as the archetypal representation of cultural past emphasises the behavioural element of exhibition.

Taking the limited perspective of the creator or curator, multi-vocality and contest is readily apparent:

Every museum exhibition...inevitably draws on the cultural assumptions and resources of the people who make it. Decisions are made to emphasise one element and to downplay others, to assert some truths and to ignore others. The assumptions underpinning these decisions vary according to culture and over time, place, and type of museum or exhibit. Exhibitions made today may seem obviously appropriate to some viewers precisely because those viewers share the same attitudes as the exhibition makers, and the exhibitions are cloaked in familiar presentational styles. We discover the artifice when we look at older installations or those made in other cultural contexts. The very nature of exhibiting, then, makes it a contested terrain (Lavine & Karp 1990:1).
As a final opening comment, we hear Vogel observing that “an exhibition on how we view African objects (both literally and metaphorically) is important because unless we realise the extent to which our vision is conditioned by our own culture, unless we realise that the image of African art we have made a place for in our world has been shaped by us as much as by Africans, we may be misled into believing we see African art for what it is” (Vogel, 1988:11). Her analysis of her Art/Artefact exhibition of African art in anthropology collections focuses on the way in which object value changes with exhibition context. Using Mijkenda memorial posts presented in various exhibition settings (e.g. reproductions of traditional museum rooms, dioramas, natural history displays, and art galleries), Vogel describes how both the display-based inference of value and the viewers’ interpreted values are influenced and constructed by the contextual setting of the objects. This complex of curation-setting-object-viewer results in a diversity of cultural interpretations of a common object, and hence explicit contestation of original represented and subsequent received value.

Cultural heritage can, therefore, be usefully analysed in terms of contested terrain. This theme is becoming increasingly central in discussions of cultural values and notably of presentation or representation of past culture, and provides a conceptual basis with serious implications, which should influence the practice of cultural heritage management. Here we identify some of the symptoms of contest inherent in constructions of cultural heritage meanings. Implicit here is the notion of construction(s) of meaning(s), and thus that an appreciation of the diversity and dynamism inherent in multiple meanings provides an invaluable approach to both intellectual and practical considerations of cultural heritage and, especially, possibilities in the realignment of method in cultural heritage management. We approach this in three ways.

- **First, we examine issues emerging in the broad cultural studies literature.** These are issues of cultural heritage itself, the cognitive ownership of knowledge, contest, the gaze, and the text as metaphorical approaches to understanding heritage. The focus of our interest is on their application to understanding cultural heritage.
- **Second, we present several case studies:** observations presented as readings of cultural heritage places. These are used to illustrate the complexity and multivocality of cultural heritage, and in all cases reflect the connectedness of diversity inherent in any item of cultural heritage, especially where examined from a cognitive ownership perspective. The specific studies are largely arbitrary, arising from the authors’ research interests, and are by no means taken as representative of specific classes of cultural heritage.
Finally, we draw a larger picture of cultural process, specifically to propose a liberating process for the practice of cultural heritage management. This process emerges from consideration of the colonial/postcolonial faces of cultural heritage management, the growing acceptance of multi-vocality in the “tracing of play of power in social formation” and a recognition that “commodity is ideology made material” (Fiske, 1989:45, 14), and the implications these have on our perception of meanings of cultural heritage.

**CULTURAL HERITAGE AS CONTESTED TERRAIN**

The theme of contest and contested terrain reflects, in part, growing and broad interests in the intellectual discourse of social and cultural studies, issues of identity, conflict of representation, construction of values, and the development of complex and often metaphorical models of explanation (e.g., Jackson & Penrose, 1993; Keith & Pile, 1993; Cloke *et al*., 1994; Porteous, 1996; Barnes & Gregory, 1997; Fuery & Mansfield, 1997). Much of the analysis within this literature applies to matters of cultural past and its representation. In particular, a sense of cultural heritage, as contested domain, most strongly emerges with practical examination of modes of representation, such as museums, heritage places, events and visitor centres, and historical writing, and their effectiveness in representing the cultural past (e.g. Karp & Lavine, 1990; Walsh, 1992; Darien-Smith & Hamilton, 1994; Gostin, 1995; Schmidt & Patterson 1995). Contested interpretations of past culture may emerge within a culture, notably with the growth and acceptance of the popular or folk cultures, which frequently challenge, counter, and question the dominant received wisdom of traditional upper- and middle-class high cultures and the perseverance of official history. Noting that history, for example, comprises “the objective processes lived and experienced by peoples which constitute the only way to understand and explain present-day social conditions,” Arena (1995) notes that official histories

…mask the real causes of historical change…[communicating] the idea that history is a linear, chronological accumulation of events, names, and dates unrelated to everyday life…[and manipulating] the knowledge of history (Arena, 1995: 47-48).

The force of contestation becomes most readily apparent where several cultural groups interact, often in colonial or postcolonial political and social settings. The contest is heightened where the representation of elements of one culture is dominated by another: the public administration of Australian Indigenous places, for example, is firmly set within the parameters of non-Indigenous governance (e.g. Pearson & Sullivan, 1995; Hall & McArthur, 1996), despite efforts to involve Indigenous people in heritage management (cf. Birckhead *et al*., 1993; the same applies elsewhere, e.g. Kerber, 1994). Ultimately, and given the intellectual and political traditions of historically and colonially established behaviour still influential in nominally postcolonial societies, any change becomes an issue of national and inherently contested
politics. Any statement of re-representation and restructuring of cultural heritage management, which will often include the recognition of the plurality of represented values, presents an expression of what Wylie, in reviewing alternative writings of history, describes as the “struggle against various forms of dominant history and against the terms of its construction—the structures of opposition, the presuppositions about historical scholarship and authority—where these threaten to infuse and usurp the alternatives” (Wylie, 1995:258).

NOTIONS OF CULTURAL HERITAGE

The discussion here emerges from previous work, in which the inadequacies of what are considered to be oversimplified statements of cultural values attached to particular types of cultural heritage places (archaeological sites, Indigenous spiritual sites, historical buildings, visitor centres, and so on), appear to have led to the problematic management of these places (Boyd & Cotter, 1996; Boyd et al., 1996). That work recognised that the individual cultural heritage ‘site,’ the conventional focus of administrative and legislative cultural heritage management (e.g. English, 1994; Flood. 1990; Hall & McArthur, 1996), is becoming increasingly inadequate. Cultural places have been traditionally defined in culturally, temporally, and geographically limited ways: definitions tend to be monocultural or monoethnic, to a lesser extent monotemporal, and most frequently microgeographical. In this context, several processes are assumed: (i) the cultural place is defined by reference to one cultural and often ethnic group, who claims or is attributed sole proprietary rights over the cultural capital of the place; (ii) the place is identified in terms of a static history fossilising meaning to a few single points in time; and (iii) the place is defined by its immediate surroundings (often pragmatically expressed in land-tenure terms and physical fencing) as an individual point seemingly unrelated to its landscape contexts.

Two trends indicate that this individual-site-focused approach is increasingly inappropriate in managing cultural heritage. In archaeology, cultural landscape concepts emphasise the connectedness rather than the singularity of sites (e.g. Head et al., 1994; Ross, 1996) and the importance of landscape and environment in the understanding of past human behaviour (e.g. Butzer, 1982). Second, the increasing awareness and vocalisation of Indigenous and other community claims to land and places (e.g. Fourmille, 1996; Lippman, 1994; Toyne & Vachon, 1984) draw attention to the complexity of interest in sites within any landscape, resulting in Indigenous and community involvement (albeit often still marginal) in site and area research and management (e.g. Birkhead et al., 1993; Kerber, 1994; Layton, 1994a,b). Consequently, cultural heritage sites become identified within complex social and physical landscapes, and heritage managers need to be able to recognise, identify, understand, and operate within such landscapes (Cotter et al., 2001).
There are several implications of such an analysis of cultural heritage places and their management. First, the traditional monolithic approach to cultural places represents an intellectual denial of meaningful cultural, social, political, and geographic understanding of the place. Second, the practice reflects a denial of the multiplicities of meaning, the modes of construction of these meanings, and the complexities of overlapping landscapes implied by the places. Third, in practical terms, political and administrative issues of site access, use, and management become blurred by simplistic notions of meaning, which are often characterised by the uncritical and monolithic acceptance of a single and indisputably correct history, and become sidetracked into discussion and debate which is at best trivial and at worst inappropriate, unnecessary, and adversarial.

**COGNITIVE OWNERSHIP OF CULTURAL HERITAGE**

From this situation, Boyd and Cotter previously developed the idea of “cognitive ownership” (Boyd & Cotter, 1996; Boyd *et al*., 1996), a deliberately provocative term designed to focus attention on the diversity of socially constructed values, which may be identified for any cultural place. Founded on the concepts and pragmatics of social construction theory (Jackson & Penrose, 1993), the term refers to the interest in or association with a cultural site claimed, even implicitly, by any person or group who attaches some value to that place. As such, cognitive ownership represents the link between people and place defined by the intellectual, conceptual, or spiritual meanings a group or individual attaches to the place. For each individual, the place is defined by some constructed meaning; that meaning may be articulated through a sense of the landscape within which the place has value. The emphasis of social construction theory is to recognise multiple meanings: the important issue is not the truth or validity of one meaning over another, but merely their identification. Using this approach, the cultural heritage place ceases to be an isolated place, but is relocated within sets of parallel, particular, and cognitive landscapes constructed under the influence of many social and cultural parameters (see Gould & White, 1986; Haynes, 1981; Tuan, 1974, 1977). It therefore becomes one node within overlapping networks of physical, social, cultural, and political linkages, pathways, edges, landmarks, and surfaces.

The upshot of a cognitive ownership or social construction analysis of cultural heritage places is that for every place a wide range of “owners” and meanings can be identified, each with particular relationships with the place and, importantly, with every other owner (Boyd *et al*., 1996: Figure 4). Further sociocultural values studies reveal a further dimension to this issue. In studying or managing such places, values and owners shift: new values emerge as site significance is assessed or become more widely known, or existing values evolve, possibly becoming redundant or elevated in importance. New owners also emerge following changes in public perception of the place as active study or management draws attention to the place. Here,
we document such shifts, illustrating them by example, and discussing them in the context of contemporary conceptual models. In this regard, our previous work represents an example of an application of social analysis (social construction theory) in the interrogation of cultural heritage and its management. Progress, however, demands the application of some stronger critical theory, not merely to identify patterns of values but to define processes of value attribution and change (see Fuery & Mansfield 1997).

**CONTEXT AND GAZE: CULTURAL HERITAGE AS TEXT**

Given the observations introduced here, and given their implications in terms of potential diversity of value, meaning and cognitive ownership inherent in every cultural expression, and the fluid nature of these values and meanings, a timely revision is in order. It is now necessary to revise the source of value and meaning and to divert attention from the object (the cultural place or artefact) to the subject or observer, or person making value judgments about the place or artefact. As Demeritt (1996:500) indicates, “For too long we have been debilitated by the notion of disembodied, Olympian truth and the correspondence theory of knowledge.” This suggestion is, however, not novel. In reviewing the role of “human agency—of the powers and capabilities of human beings,” Barnes & Gregory (1997:356) draw attention to several important and relevant themes. First is the danger, described by Daniels (1997), of inattention to context and convention, both social and historical. Thrift (1983) reinforces this with a call for a “fully contextual social theory…one that is rooted in the continuous flow of social action in time and space” (Barnes & Gregory, 1997:361). Related to this, Daniels indicates the strength to be gained from an evaluation of the subjective over the objective:

> [The] process [of narrative], a dialectic of discovery and construction, can involve complex and delicate adjudications: between the perspectives of participants and observers, between particular incidents and general themes, between competing theories. Interpretation and judgment are ingredients to narrative, not operations performed before or after the evidence has been collected and processed. (quoted in Barnes & Gregory, 1997:374)

Clearly, this path of inquiry and analysis has considerable implications for the study and management of cultural heritage. By focusing on context rather than object, one is forced to consider all those people and groups who, by their interaction with the cultural heritage, inevitably create meanings and construct values regarding that heritage. While some of these constructions may remain purely cognitive, others translate readily to behaviour, and here the realm of management practice becomes explicitly implicated. Crudely, what is to be done about the people using the sites? Dressed up as visitors, they can be controlled, educated, entertained, distracted, and so on by the gamut of available practical human management techniques (e.g. Hall & McArthur, 1996; Pearson & Sullivan, 1995; Uzzell, 198;). However, where cultural sensitivities tend in a particular direction, some visitors are assigned greater or lesser status: individuals or groups become custodians (officials, Indigenous representatives, and so on) or
problems (the skateboarders and pedestrians at Gumbooya; see below). Where officialdom is particularly rigid, defining appropriate designation of authority becomes problematic: only one Indigenous representative, after all, can be the true owner of the midden at Beachmere (see below), and where competing claims are evident, the bureaucratic response denies all validity of values held. By adopting the “Olympian truth” model of a single, objective meaning at any cultural heritage place, Barnes & Gregory’s “fluid movements between agency and structure” (1997:361), the shifting values and meanings held about cultural places by all people associated with these places, are ignored.

This call for a shift in intellectual tradition informing heritage management is little more than a reinforcement of our opening exposition that the application of social construction theory may inform cultural heritage management. It remains to be considered if some useful theoretical structure may assist in understanding the processes explicit in the “fluid movements between agency and structure” (Barnes & Gregory 1997: 361). This would involve considering the relationship between dominant and subordinate action in society, a relationship that is inherent in social construction theory. This, however, begs the question of the object-agent relationship, and it is with this that we briefly close this section.

The humanist tradition of inquiry contains many starting points for considering the relationship between object (here, the heritage place or artefact) and the agent (the person viewing or interacting with it). A dominant metaphor is the gaze, the active perceptual engagement of the person with an object. Fuery & Mansfield (1997:70) summarise the idea of the gaze as being “bound up with formations and operation of subjectivity…the gaze is not simply the mechanism of perception, but rather a fundamental structure in the ways in which the subject relates to the cultural order….” It is a complex structure, which contributes to the self-making of identity. It allows expression of self-identity through the construction of ideas focused on an object or other subject. It is potentially a reflective process, which requires a form of reinforcement:

_We constantly seek the gaze of some, other (person, group, institution, ideology, etc.) in order to confirm our sense of presence. Making sense of a text—that is, having a sense of relevance for the text, and from the text—is part of the process. When we read we are seeking confirmation from the gaze of the text_ (Fuery & Mansfield, 1997: 81).

This form of analysis revolves round the acceptance of two other concepts: the object as text, that is, as something to be read; and the meaning of reading emerging from the action of reading, and being constructed by the reader rather than by the author. The extension of these concepts is that all texts are interrelated, that is, that “the constituent parts of a text refer back to, quote, and react with all the other texts that exist around them, and have existed before them…[and are]…part of some vast interconnecting collection of images, representations,
meanings, part-meanings, ideas, impressions, and memories” (Fuery & Mansfield, 1997:56-57). Equating cultural heritage with text, to be read by all those coming into contact with it, provides a powerful metaphor with which to contextualise the multiplicity of values, meanings, and landscape contexts described, as, for example, in the studies below. The multiple social and political readings of the Gumbooya engraved rock site, the diversity of official responses to land-use conflict at the Beachmere midden complex, and the capability of the Byron Bay shipwrecks to acquire new meanings, all represent the gaze. However, they are not simply what Fuery and Mansfield (1997: 56-57) describe as a “mechanism of perception,” but rather display their “fundamental structure[s] in the ways in which the subject[s] relate to the cultural order,” properties that are embedded in the cultural heritage and its diverse constructions. The intertextuality of these examples is articulated in contentions surrounding these items of heritage. Identifying multiple landscapes into which the individual heritage places and items may be articulated reinforces the essential intertextuality of the constructs surrounding these places and items (Cotter et al., 2001). Furthermore, adopting the metaphor of text as an analytical device opens the way for an analysis of cultural heritage that expands the range of acceptable views and meanings for that heritage. In particular, the multiplicity of gazes becomes acceptable, as does the continuing action of redefining and multiplying values.

The liberating implications for management must be evident and will be developed below. It should be noted, however, that in practical terms, cultural heritage management could be enhanced by adopting relatively simple conceptual models of value and action structures for analysing environment-people relationships. Two such examples are Porteous’s (1996) model of the interaction between scientific rigor and political urgency in defining dominant intellectual and practical approaches to environment issues, and Short’s (1991) links between myths, ideologies, and text in the study of relationships between environment, culture, and society. These and many other models provide useful practical constructs to link the complexities of cultural theory framing and intellectual acceptance of multiple read meanings, the complexities of multiple constructions of cultural heritage meaning inherent in any pragmatic view of cultural heritage, and approaches to cultural heritage management sensitive to these complexities.

**SOME READINGS OF CULTURAL HERITAGE PLACES**

*In considering...problems it is easy to believe, each to ourself, that the issues and problems are clear, the processes understood and the solution therefore at hand. If this were so it would be good. Such views are generally rapidly dispelled if the views are articulated to others. Then the range of views press on us, and the lack of common knowledge becomes apparent....One of the greatest problems in modern life is the enormous range of messages in the milieu in which we live. Our lives are overcrowded and we deliberately switch, selecting what we want to hear and react to....In all this we run into the wide range of views and attitudes. In one way it is a great feature of our society that we have our diversity of values, beliefs, attitudes and understandings; it leads to our fascinating lives as human beings (Johnson, 1994: 46-48).*
Thus, an environmental scientist synthesises the human contribution in comprehending complexity in environmental degradation. The emergence of the common theme in any discussion of environmental degradation that there are as many perceptions and understandings of the degradation process as physical factors, and thus of the practicalities of environmental management, the conception of complexity and diversity of opinion regarding underlying causative effects become a useful analytical artefact (e.g. Dovers, 1994). Likewise, we can turn to the practicalities of studying and formulating realistic management practice in cultural heritage contexts. As indicated above, the values, equivalent to the perceptions and understandings referred to above, may be diverse, and, importantly, lead to equally diverse management practice.

In this section, case studies are presented, not for their own sake but for the light they shed upon the process or structures of value formulation. The processes importantly reflect the existence of fluidity and evolution of ideas and values attached to cultural heritage. Equally, they highlight the influence of the politics of site management and the effects of networks of interested people upon the construction of meanings and values, which in turn guide people’s cognitive association with these cultural places.

Six case studies from coastal New South Wales and southeastern Queensland (Australia) independently provide an insight into the way the meanings and values attached to places evolve and conflict during their public exposure. They loosely cluster into three classes of cultural heritage place.

- **Historical shipwrecks:** Suffolk Park, where a public campaign of concern developed over the potential destruction of a shipwreck site, and Byron Bay, where a confusion of cultural and natural values developed within efforts to develop a management strategy for the recreational use of a shipwreck site;
- **Historical settlement places:** Woody Head, where a study of the values of place held by long-term campground residents resulted in a sophisticated geohistorical statement of personal values, and Alstonville, where a landscape heritage study increasingly elicited community understandings of historical values associated with the landscape; and
- **Aboriginal places:** Beachmere, where legal considerations of conflicting land use provided the stimulus to articulate a diversity of values, meanings, and interest in the Indigenous cultural landscape of this coastal area, and Gumbooya, an Aboriginal rock engraving site in suburban Sydney, where unconventional site uses highlight the inadequacy of a unitary value system.
Each study emphasises that while underlying community knowledge of historic and cultural values was attached to the places, the action of studying these values resulted in an evolving construction of interests and values. The involvement of academic researchers, public campaigners, and public administrators led to the places becoming increasingly and more complexly valued as historic and cultural places by the community.

READINGS OF TWO HISTORICAL SHIPWRECKS

THE SUFFOLK PARK BURIED SHIPWRECK

At Suffolk Park, a historic shipwreck is buried within coastal sands. That the vessel was there has been known since the 1920s, and it was re-encountered during sand mining in the 1960s. Its exact location has been lost, and there is an opinion that the vessel’s remains may have been destroyed during the sand mining. However, several artefacts were removed in the past, and their recovery a few years ago in part stimulated a renewed interest in the vessel. For various reasons, the shipwreck was originally considered to be of considerable antiquity but was later proven to date from the late nineteenth century (Boyd, et al., 1993, 1994; Boyd, 1995). This shipwreck has attracted much interest from community and professional groups (Boyd & Cotter 1996; Boyd et al., 1996).

Of importance here is the history of interest in this place. Much of the recent renewed interest stems from a local campaign against a proposed residential development. Prior to this campaign, local residents had been aware of the vessel and had considered it to be part of this coastal area’s shipping history. However, one of the campaign’s chief participants identified the shipwreck as part of the natural and cultural heritage threatened by development, and thus part of the evidence required to disallow any residential development (it was later shown that the proposed development did not actually affect the place). Closely allied with this campaign was the creation of a history, now shown to be largely fallacious (Boyd et al., 1994). In essence, the presence of the vessel was conflated with a particular interpretation of Aboriginal stories of a massacre of early sailors following a shipwreck and altercation involving the rape of a local Aboriginal woman or women. This interpretation was supported by estimates of the story’s age by reference to the generations of storytelling associated with it, and by putative identification of a local rock feature as a primitive fort in which the sailors may have sheltered. This interpretation implied an age for this European ship predating, possibly by several centuries, the earliest documented European presence on this coast, and thus attracted considerable public attention. Consequently, amateur and professional historians, archaeologists, and other academics became involved, as did officials of the Heritage Branch of the New South Wales
Department of Planning, and members of the public. Each of these people or groups acquired an inherent interest in the site and contributed to the understanding of this heritage site. The current understanding now depends upon the individual interpretation held. The scientific evidence indicates a recent age and thus lesser historical significance, and the official view largely corresponds to this interpretation, although with some difference of details. A section of the community probably still considers the vessel to be older, and prefers the original interpretation. An interesting development is the Aboriginal involvement. While the site is strictly not an Indigenous one, the early interpretation of association with European-Aboriginal contact has considerable Aboriginal significance. As the issue ran its course, the local Aboriginal elders notably reiterated the early-presence interpretation, and thus gave it the respectability of received tradition, probably reinforcing community acceptance of this interpretation.

**THE BYRON BAY HISTORIC SHIPWRECK HERITAGE**

The management of historic shipwreck heritage may seem a relatively benign undertaking, largely devoid of issues of cultural interaction, misappropriation, and inappropriate context that may influence the management of Indigenous places, and largely focusing on practical matters of material conservation. This assumption is to a degree reflected in the relatively straightforward assessment process used by government agencies in reviewing the cultural significance of shipwreck sites (e.g. Heritage Office, 1996a,b). At Byron Bay, generic heritage assessment guidelines (Anon., 1990) were adapted to suit the local underwater heritage (Clegg, 1997). Evaluation followed official state guidelines and represented the traditional approach to defining cultural heritage values. It followed a three-stage process of (i) investigating the range of heritage values, (ii) interpreting and comparing heritage values, and (iii) classifying the significance. Thus, heritage values were first defined by reference to historical, scientific, cultural, social, archaeological, architectural, aesthetic, natural, and Aboriginal significance. Interpretation then focused on rarity, group value, landmark value, representativeness, and integrity, and finally classification placed these significances in local through to global context.

The emphasis is on the cultural and social elements of cultural heritage, and in reality it is these elements which will determine the managerial fate of a place. While Clegg was able in this case to identify some significant elements of (mainly) historical, social and archaeological importance, and thus to make a case for further investigation, he also made passing comments of some relevance to the discussions here. In the case of the wreck of the ship Wollongbar, he noted that the site serves as habitat for endangered marine species. A similar conclusion was drawn for nearby historic jetty remains, which were noted to provide a hard substrate and thus a refuge for marine organisms atypical of this sandy bay. In the case of the wreck of the Tassie II, openings within the wreck provide habitat for green and loggerhead turtles, both identified under Schedule 2 of the New South Wales Threatened Species Conservation Act (1995).
significance is that the wrecks provide a hard substrate within a largely soft-bottomed bay, introducing a micro-environment highly suited to these endangered animals. This cultural heritage’s significance has thus moved considerably from its initial role as historic monument, with all the social and archaeological implications such a definition brings, to being items of significant environmental importance. This expansion of value, however, continues. Presently, consideration is being given to these sites as recreational places. Based on their historical interest and their emerging natural values, they are now acquiring recreational value, only, one suspects, to be further enhanced by the increasing natural value of these places.

READINGS OF TWO HISTORICAL SETTLEMENT PLACES

WOODY HEAD RECREATIONAL CAMPGROUND

Woody Head is a small settlement within the coastal Bundjalung National Park of northern New South Wales. The location comprises a rocky headland, extensive tidal rock platforms, beaches, and a sheltered bay. Importantly, the settlement includes a campground used for much of the twentieth century by residents of nearby rural towns, and it has been often used by these residents over many years. Facilities include a shop, National Parks buildings, and a boat ramp. The locality has a long Indigenous association, including an interdependency and interrelationship between the local Yaegl people and the land, defined in terms of Yaegl mythology. However, non-indigenous use forms the basis of the study reported here (Taylor, 1997), a study centred on the place as a recreational place set within the culture of long-term, if periodic, residents of the campground. Woody Head’s non-indigenous history revolves around recreational activities (camping, fishing, swimming, and boating) and professional fishing. Through the use of intensive interview methods, the study of the meanings that non-Indigenous residents attributed to the place was founded on a recognition that meanings are not essentialist, but subjective and formed by groups and individuals, and that the meanings and their interpretation reflect the complex of social and cultural relationship of both interviewee and interviewer (Maykut & Moorhouse, 1996; Taylor & Bogden, 1984; Tuan, 1974, 1977). The study was open to a complex diversity of expression of meanings, an openness appreciated by the interviewees. Reporting the findings to the participants, interestingly, appears to have enhanced their sense of value and meaning and provided sanction to previously non-explicitly held views.

In practical terms, the study was structured round the initial identification of groups of cognitive owners: eight groups were identified, and a single member of each was interviewed. These private views were complemented by official views derived from documents relating to the place. These sources revealed many meanings of the relationship between residents and place: the cultural constructions of the place. These were embedded in the perspectives of each
participant and official group, and appear to be related to the background of each, reflecting, for example, personal attributes such as gender and age, and cultural, political, social, and economic structures that define the participants’ lives and life histories. Structuring the emerging meanings provided eleven broad categories (the following headings are given in keeping with the personal approach of this work; the participants’ own words are used): Freedom (a place for the different and new); Familiarity (continuity and ritual); “Woody Head as an inspiration for me”; “It’s part of our culture” (the culture(s) of Woody Head); Conflict and power; Woody Head (money and work); “It’s a safe place”; “A people’s place” (family, friends, and generation); “A whole pile of memories”; The landscape; “It’s just a very beautiful place”; and Woody Head is “special.”

These clusters of meanings were spread across the eight owner groups. Many, such as those expressing ideas of safety and recreational values, were evident across diverse groups. However, conflicts of meanings were also evident where fundamental constructions of meaning differed, such as the National Parks and Wildlife Service’s perception that people were only visitors to Woody Head (the service is the official manager of the place). The permanent site holders, on the other hand, consider Woody Head to be an integral part of their lives, and, based on a significant history of presence and the essential cultural role the place plays in their lives, that the place belongs to them and they to it.

Beyond these parallels or conflicts, however, it was also evident that the meanings identified are not confined to one boundary or under a single heading. They are fluid; they cross and meld within each story of meanings. They change and reflect each other in the telling, forming a complex, total but ever-changing view of Woody Head and the meanings constructed around it. In particular, the mixture of meanings appears to get more complex over time, with the interweaving of human, place, landscape, and meaning, at times resulting in increasing depths of feeling for Woody Head. As noted above, the very process of this study contributed to this dynamic evolution, assisting in part to articulate and reinforce or support certain expressions of these cultural meanings.

ALSTONVILLE HISTORIC TOWN AND COUNTRYSIDE

The Alstonville study attempted to determine, as part of the local environmental planning processes, whether the surrounding rural landscape was deemed a valuable landscape of cultural significance (Gardiner, 1999; Gardiner & Knox, 1996). Alstonville is a relatively small, rural village, founded in the early twentieth century in the relatively densely populated rural area of northeast New South Wales, and located on a basalt plateau close to an escarpment overlooking the ocean and a plateau edge with views toward forest-covered mountains. The plateau is regarded as a distinct entity within the region, and the town tends, as with many small towns in
the region, to have a distinct if often not clearly articulated identity. With little previous heritage assessment in the immediate area, the local community was consulted to identify local indicators of cultural significance, community understandings of values attached to the landscape, and any particular senses of attachment to heritage items.

This study adopted a social value methodology (Johnston, 1994), placing emphasis on the expression of social values as indicators of a significant interest in an area’s cultural heritage. The study revolved around group and individual interviews, with younger people being engaged through a high school photographic assignment. In this study, the term *heritage item* became a general one referring to items of cultural significance and largely reflecting community expressions of what was considered to be cultural heritage. As a truly social construction, the term was defined in response to the participants’ developing expression of cultural heritage and included a wide range of places and objects: moveable objects, relics, street trees, cultural landscapes, towns, buildings, gardens, conservation areas, waterfalls, swimming holes, and so on. This approach confirmed that people develop attachments to places as a consequence of using these places over time, and it acknowledges that there is more to heritage studies than what is usually gleaned from historical or material research on the physical landscape (Gardiner, 1999; Gardiner & Knox, 1996, 1997).

Prior to this study, twenty-four local places had been listed on the registers of the National Estate, the New South Wales National Trust, and the Ballina (that is, local) Shire Council Local Environmental Plan. Following this community participation study, in which participants were encouraged to think of heritage in broad terms such as natural features, historic items, views and travel routes, landmarks, and community places, over a hundred items were identified as locally important. Notably, this list was much wider than those in the various official registers, including such items as local waterfalls (important in social history as well as for aesthetic values), land activities such as peanut cultivation and “stooking” (regionally and aesthetically distinctive), public works such as the local Duck Creek weir, and landscape views. Furthermore, most formally listed items were considered important to the community. The omission of some items, however, may have been an artefact of the survey or a reflection of shifting public knowledge or values.

By broadening the expression of cultural heritage, notably by encouraging the community to construct its own expressions of significance and value, several consequential outputs now contribute to the redefinition of the area’s cultural heritage. These outputs include a formal report identifying community-based heritage items, now lodged in local libraries, public talks to community groups, heritage tours to special places in the area, a heritage main street study, a heritage information board for public display, and a successful application for listing on the
register of the National Trust of New South Wales. These all have an impact upon the community and its respective memory and attachment to heritage items, and thus have redefined the public understanding and expression of the cultural heritage value of the area.

**READINGS OF TWO ABORIGINAL PLACES**

**BEACHMERE ABORIGINAL MIDDEN COMPLEX**

Issues of heritage value definition at the Beachmere midden complex in Moreton Bay, southeast Queensland, emerged as a by-product of litigation associated with an application for sand extraction. Here, Aboriginal archaeological sites formed the focus of community and professional interest during the litigative process (Boyd & Cotter, 1996; Boyd et al., 1996). That process required explicit statements of interest from all parties, and allowed for a detailed examination of the relative roles and views held by each party. The midden complex, comprising shell middens of varying size and age, is a valuable regional archaeological resource whose integrity is threatened by recent land-use development. For this discussion, what clearly emerged from the litigative process was the diversity of interest and range of groups who claimed cognitive ownership of this cultural heritage. Importantly, some cognitive owners, especially local residents, became aware of their role only during the process. Equally, several Indigenous groups claiming right of ownership, and each defining that right differently, became apparent only when their role regarding the site needed to be clarified. For each group, a social, political, cultural, and economic context can be described, and for each context, subtle differences in inferred cultural value can be identified.

Of particular interest in this analysis is the complex of interactions between identified groups. From mapping the web of relationships between groups, it became apparent that neither the notion of cultural place nor the interests of groups in cultural places were static or absolute (Boyd et al., 1996). Each may be influenced by links between potential stakeholders (government legislation, for example, may affect the way groups and individuals define and express their association with a cultural place) and by the dynamic nature of the relationships between individual groups and cultural places. The mining industry, for example, has a capacity to create, destroy, modify, and interpret places of cultural heritage value, depending on criteria such as the nature of the place, economic imperatives, and historical perspectives. Indeed, by mapping the web of relationships, an ecological-type system became evident, defined by cognitive owners, landscape ideas and values, strategic and political relationships, and so on. Few components were static, and shifts in one necessarily affected all others.

Whatever the focus, a striking element of this analysis was the complexity of this cultural place and its definition as either an isolated site or a cultural landscape and, by implication, the
potential effects such interpretations have on stakeholders and their competing interests. Previously, with reference to the notion of *midden complex*, a cultural landscape model encompassing past and present Indigenous landscapes was deemed appropriate for the interpretation of the area’s cultural heritage. It became clear from the nature and number of identifiable cognitive owners, however, that many claims of association with or cognitive ownership of the midden complex existed. Interestingly, it was evident that the very nature of the perceived threat to the heritage in part defined those groups and individuals claiming association with the heritage, and had the potential to introduce values seemingly unrelated to the original issue.

A perceived threat to the broader regional environment produced claims of association by such regional groups as the Sunshine Coast Environment Council and the Bribie Island Environmental Protection Association, whose concerns related largely to wildlife habitat change and depletion. The principal non-Indigenous community group was the Beachmere Community Association, whose claim of association was based on the threat to local amenity expressed in terms of ecological damage, pollution, increased traffic, and potential land devaluation. Interestingly, from an Aboriginal cultural heritage management perspective, local residents supported those Indigenous community groups who, largely because of inadequate consultation and a perceived threat to their cultural heritage, opposed the sand extraction operation. Much of this non-Indigenous community support can be attributed to genuine concern for Aboriginal cultural heritage, although some of this support appears to have been political: Indigenous cultural heritage issues, because of their complexity and sensitivity, were perceived to be pivotal in preventing the sand extraction operation.

Five Indigenous community groups were identified in this process: FAIRA (Foundation for Aboriginal and Islander Research Action), the Dalaipi and Jindoorburrie organisations, and two tribal groups, both referring to themselves as Gubbi Gubbi. FAIRA makes a claim of association on the basis of a general concern for Aboriginal cultural heritage and a perception that inadequate research was employed in the original environmental impact statement to establish legitimate claims to cognitive ownership of the midden by Aboriginal groups involved. Although FAIRA has interests shared by all Indigenous groups, all such groups did not support its advocacy role. The two Gubbi Gubbi groups claimed cognitive ownership of the midden complex and surrounding area on the basis of tribal and kinship affiliations, but differed in their form of kinship. In contrast, the Dalaipi group is a social action organisation primarily concerned with assisting local Aboriginals with access to housing and health care, and it is intimately linked with the Jindoorburrie organisation. These two groups associate with the midden complex by a social and historical attachment to the area and a clear delegation of cognitive ownership rights to the cultural heritage via a tribal affiliation with the Undanbi tribe,
which is considered by the Jindoorburrie to be the only tribe with ownership rights to the midden. This denies the Gubbi Gubbi claims of exclusive ownership based on tribal affiliation.

These competing claims of tribal affiliation introduce complexities to the cultural heritage management of this midden complex, and they are further complicated by the association of group members with external bodies as government and industry advisers. A trainee heritage officer with the Department of Environment and Heritage, for example, both has affiliations with the Dalaipi and Jindoorburrie organisations, as well as a historical link to the area as a former resident, and is influenced by departmental policy and research methodology. Whether real or imagined, potential conflict of interest arises, possibly affecting the implementation of government policy and, more importantly, giving one group preferential access to the decision-making process.

**GUMBOOYA ABORIGINAL ROCK ENGRAVING SITE**

Gumbooya, an Aboriginal rock engraving site in Sydney, New South Wales, is superficially less contentious: there are no matters in litigious contention here, although the study of associated values and cognitive ownership yielded some less tenuous, but theoretically more important, processes. Gumbooya Reserve is an area of bush and rock outcrops in the northern suburbs of Sydney with Aboriginal rock engravings typical of the area’s Aboriginal cultural heritage (Boyd & Cotter, 1996; Boyd *et al.*, 1996; Sattler, 1995). Several official bodies (the National Parks and Wildlife Service, the local Shire Council, and the regional Aboriginal Land Council) have responsibilities for this site, but on investigation of community interest, several additional important and entirely unofficial public groups were identified as having inherent interest in the site. They all thus have claims as cognitive owners. The rock surfaces provide short and convenient pathways through the reserve between residential areas and the local College of Technical and Further Education and a shopping centre. Furthermore, some of the rock surfaces provide ideal ramps and ledges for skate boarding, a use encouraged by the fact that this site is more conveniently located than local official skateboard ramps. Officially, management issues at the site cover a range of typical issues: control of access, interpretation and representation of the site as Aboriginal heritage, control of weeds and other physical intrusions, and removal or limitation of sources of damage to the site. When appropriate management was being determined, it became apparent that the various groups with some legitimate interest in the site hold very different conceptual values regarding the site, and each places the site within a different geographical context.

The official bodies have some legitimate access to ownership, albeit framed within the limits of their jurisdiction; this is moderated by the individualistic approach of individual staff members, who are influenced by not only the culture of their employer but also their own personal cultural
context and experience. The National Parks and Wildlife Service has a statutory obligation to protect and preserve the site and therefore officially places the site within the context of the totality of Aboriginal sites, both as physical entities and as cultural items, in the state. The service staff, while working within the service legislative and institutional context, tends to impose a greater personal sense of value upon the site as both an Aboriginal and a natural site of local and regional importance. This duality of value results in the staff placing the site both into a statewide, official context, defined in terms of the distribution of Aboriginal sites, and into the local and regional contexts of such sites and their local and regional distribution and Aboriginal meaning. Furthermore, the value of this particular site is enhanced when viewed as a node of uncharacteristic nature within a specifically urban geography. The local government authority responsible for this area takes a different value stance for this place. Whereas individual staff members recognise heritage value in the site, official interest provides indirect cognitive ownership of the cultural heritage, constructing the site as a place of natural bushland conservation and protection. Geographically, values are localised within the geographical and socioadministrative context of local government authority.

The third official body provides interesting comment upon the emergence of site-specific value. The relevant local Aboriginal Land Council represents Indigenous views in this region and has, ostensibly, the greatest claims of cognitive ownership of a site such as this. It, after all, represents the activities of the cultural ancestors of the region’s Indigenous people. The Land Council and its members clearly view this site as an intrinsic part of both the past and present Indigenous cultural heritage: it is representative not merely of past events, but is a physical manifestation of present Indigenous residence. However, interestingly but perhaps unsurprisingly (there are many such sites in the region), the Council did not know of its existence prior to late 1995, when it was approached by a researcher inquiring about the values and relationships between people of this site. The Council, therefore, did not have a specific cognitive interest in the site, but found it very easy to transfer a general interest in such sites to a specific interest in this site: this transfer was done in a matter of minutes during an interview. Once done, the site became valued on a number of planes. Its intrinsic value as an engraving site dovetailed well with the council’s view of a network of sites under threat by conflicting land use within the council’s jurisdiction; as a site type, it could also be placed into a broader regional distribution of like sites. Most importantly, however, the site was immediately placed into a political landscape of Aboriginal claim to sites and the desire to exclude (most) other people and uses from the site; its engraved symbolism became subsumed into a strong contemporary political symbolism.

Despite these official statements of value, further interest is evident. Local, non-Indigenous residents played a pivotal role in defining this cultural place. A group of pedestrians valued the
site as a convenient pedestrian thoroughfare: this valuation has bearings on site management, and other than indicating a construction of place in terms of local geography, adds little to the development of cultural value. A second group, local skateboarding youths, took a much more active role in developing cultural value. The location and geometry of the site makes it a most suitable and accessible skateboard site, and local youths value this site as such. However, in doing so, they are reinforcing values of a local subculture and marking the place as a focal point of that subculture. This may be seen as a natural extension of the original function of Indigenous engraving at the place: it has heightened value within the culture of the social group using the place, which contributes to the self-definition and assertion of that culture. This activity, therefore, imparts upon the site a sense of heritage value integrally associated with contemporary youth culture, which, while it may be most closely associated with original site function, is likely to elicit the strongest opposition from other cognitive owners.

The final group, while also apparently being relatively benign, a benignity marked by the lack of any opposition to its activities, possibly presents a cultural process of equal import to the skateboarders’ cultural redefinition. There were local residents, mainly those whose houses back onto the reserve, who had developed a sense of the site being important as an Aboriginal place. One resident adopted an unofficial custodial role, keeping an eye on the site and keeping the site tidy and in good repair. This was the strongest sense of custodianship displayed by any of the parties associated with this place and to some extent had replaced the traditional Indigenous custodial role at the site.

A DISCUSSION: RIGIDITY OR A CHANGING ORDER?

An important feature of colonial discourse is its dependence on the concept of fixity in the ideological construction of otherness. Fixity, as the sign of cultural/historical/racial difference in the discourse of colonialism, is a paradoxical mode of representation: it connotes rigidity and a changing order as well as disorder, degeneracy and daemonic repetition (Bhabha, 1994:66).

Every commodity reproduces the ideology of the system that produced it: a commodity is ideology made material....Culture [is] the active process of generating and circulating meanings and pleasures within a social system: culture...can never be adequately described in terms of the buying and selling of commodities.... In a consumer society, all commodities have cultural as well as functional values....The audience...now becomes a producer...of meanings and pleasures. The original commodity...is, in the cultural economy, a text, a discursive structure of potential meanings and pleasures (Fiske, 1989:14, 23, 27).

While the case studies represent empirical observations (but consider the implication of the concepts of heritage as text), it is important to consider whether they can be framed within broader conceptual contexts. Are they unique observations or examples of general cases? A growing literature of critique identifies cultural values as complex, in many cases intangible,
and certainly multifaceted. Bhabha’s observation of the role of fixity in the colonial discourse provides a valuable starting point in analysing the examples. Bhabha’s fixity, of course, is presented as a foil for a discussion of the diversity and fluidity of cultural values and the diversity of expression, whether viewed as a reading or as an articulation of cultural values. Fiske’s analysis of popular culture indicates a useful direction that such discussion may take, one in which the processes of generation and circulation or expression of meanings as cultural commodities allow some understanding of the system within which they are evident. In practical terms, this may provide a guide to the practice of cultural heritage management.

However, returning to the colonial allusion is an important step. By doing, so, one is forced to contemplate the concept of cultural heritage management. In the immediate sense, cultural heritage management is about “making better decisions concerning culturally important places” (Pearson & Sullivan, 1995:8). In practical terms, this involves the identification, assessment, and evaluation of individual objects and places, and the formulation of plans, strategies, and practical work schedules. In implementing such schemes, issues of material conservation, visitor management, education, public access, record keeping, research, and so on become increasingly important. However, all this is predicated on an underlying Western philosophy of the value of culture and its representative, heritage. This heritage may be divided into cultural places, a rather amorphous concept including in many instances the entire landscape, which represent the mark of humanity on the earth’s surface, and heritage places, which tend to be more localised and contain “some degree of heritage value or significance for people today or in the future” (Pearson & Sullivan, 1995:7). However one defines cultural places or heritage places, that definition reflects the underlying ideology of the society making the definition. Although originally aimed at understanding items of popular material culture, Fiske’s comment that ‘every commodity [read cultural heritage item] reproduces the ideology of the system that produced it: a commodity [cultural heritage] is ideology made material” is most apt here (Fiske, 1989:14).

Cultural heritage management stems from a long Western antiquarian intellectual tradition of examining the past (e.g. Horton, 1991; Renfrew & Bahn, 1991), founded in the Renaissance and the emergence of modern science from the natural history tradition. This tradition may be couched in terms of the “discovery of ‘truths’ and ‘facts,’ or rather claims for the possibility of objective truths about the world and ‘Man’s’ place within it…and thus considered as a set of discourses concerned with the possibilities of representing reality and defining eternal truths” (Walsh, 1992:7). However, in reality it is and has been set firmly within the sociopolitics of the places and times, predominantly eighteenth and nineteenth century Europe, in which it emerged. Any careful examination of the social context of science (sensu lato) is likely to reach similar conclusions to this: that “scientists are perhaps too slow to consider the connections between
their interventions in the laboratory and structures of social domination….Scientific knowledge is mediated, embodied knowledge and…scientific facts are socially constructed” (Demeritt, 1996:500). In a nutshell, the intellectual tradition from which cultural heritage management is derived and from which it maintains its place in modern Western society is the colonial expression of the positivist, reductionist, and specialist scientific tradition. Such tradition, as indeed any tradition does, determines a limiting range of possible relationships between human groups (the colonist, with a baggage of Western perceptions of racial, ethnic, and social hierarchies and conditions, and the Indigenous or Aboriginal), between people (“Man”) and nature, and between people and knowledge. This melange creates real boundaries to the type of management of cultural heritage possible within a society. Certain expressions of culture are acceptable (the high culture of opera, classical music, certain visual art forms, architecture as art rather than utility, and so on), whereas others, such as popular music, popular forms of dress, and utilitarian technology, are not. Certain values may be applied to the assessment of the quality of these expressions of culture, these values usually being those of the educated, middle-to upper-class, and, often white and male part of society. Certain evidence is acceptable, with, for example, so-called objective or scientific evidence usually outweighing folklore, storytelling, or mythology (where these latter forms are even considered). Overlaps between, for example, historical and contemporary, high and low culture, social and aesthetic expressions, and cultural and natural tend to be treated conservatively. Ethnocentric thinking and ethnic stereotyping, however well disguised, inevitably influence thinking and action. Facts are privileged over opinion and value. Finally, in terms of the actual practice of cultural heritage management a minimalist (even reductionist) approach is generally favoured.

We return to the assertion, based on observation, mentioned in the beginning, that the tradition of (Western) cultural heritage management has been to define cultural places in culturally, temporally, and geographically limited ways, and that such definitions tend to be conservative: monocultural or monoethnic, to a lesser extent monotemporal, and most frequently microgeographical. This form of definition assumes that (i) the cultural place is defined by reference to one cultural or ethnic group who claims or is attributed sole rights over the cultural capital of the place; (ii) the place is identified in terms of a static history fossilising meaning to few single points in time; and (iii) the place is defined by its immediate surroundings as an individual point apparently unrelated to its landscape contexts. All else in the practice of cultural heritage management thus follows a limited path.

In this paper, we argue, however, that by opening the definition of cultural heritage, by refocusing from object to subject, by allowing recognition of the social construction of multiple and fluid meanings, by privileging the multiple readings of cultural heritage, and by accepting a diverse and fluid cognitive ownership of cultural heritage, management may be liberated from
such limitations. Culture, time, and geography may be harnessed to create insightful and dynamic understandings of cultural heritage rather than be used to encase that heritage in restrictive boundaries.

A CONCLUSION: LIBERATION AND THE POWER OF SOCIAL FORMATION

The role of the critic-analyst, then, is not to reveal the true or hidden meanings of the text, or event, to trace the readings that people make of it; rather, it is to trace the play of power in the social formation, a power game within which all texts are implicated and within which popular culture is always on the side of the subordinate....A reading is the interplay of tactics and strategy, it is a poaching raid, it is part of the power game of culture....Popular readings are always contradictory: they must encompass both that which is to be resisted and the immediate resistances to it (Fiske, 1989:45).

In this paper, we attempt to follow Fiske’s suggested path, the tracing of power in social formation, by accepting the inherent validity of diverse meanings attached to cultural heritage evident by observation (albeit only one of the many possible readings available). In particular, we highlight several matters: the important and critical consequence of diverting attention from the cultural place or artefact as object to the subject as observer or person making value judgements about that place or artefact; the diversity of meaning that may be read into the cultural heritage, where that heritage is viewed more as text than as essentialist object; the pivotal role the investigator may play in influencing readings of the heritage; and that existing meanings may evolve through time and new meanings emerge.

The argument, therefore, becomes liberating because it accepts the legitimate right of multiple meanings as being representative of cultural heritage and rejects notions of essentialism in cultural heritage. It also accepts the fluidity and, at times, contradictory nature of these constructions of meaning. It does so for good reason: by such acceptance, cultural heritage management should invariably become more inclusive and imaginative in its application. Management thus would become a matter of identifying the poaching raids, not to detect, deflect, or deter them, but to acknowledge them and to integrate them into a more imaginative management. By doing so, of course, management would be successfully subverting the constructed meanings; the meanings often built at the popular or subordinate edges of mainstream society managing (and traditionally defining in limited essentialist terms) the cultural heritage. By doing so, it will invariably stimulate further construction of meaning. And here we return to our starting point, to the Bhabha’s “paradoxical mode of representation; the rigidity and …changing order…degeneracy and daemonic repetition” (Bhabha, 1994:66).
CHAPTER 16

SECTION II: RESEARCH OUTCOMES, WIDER IMPLICATIONS AND FUTURE DIRECTIONS

Cotter, M.M.

School of Environmental Science and Management, Southern Cross University, Lismore, NSW.

Unpublished manuscript

2008

Concept and design of research

Concept and design: Cotter, M.M.

Collection, analysis and interpretation of data

Collection analysis and interpretation: Cotter, M.M.

Writing

Writing, proof reading and edits: Cotter, M.M.
CHAPTER 16

SECTION II: RESEARCH OUTCOMES, WIDER IMPLICATIONS AND FUTURE DIRECTIONS

...for time genuinely to be held open, space could be imagined as the sphere of the existence of difference. Such a space is the sphere in which distinct stories coexist, meet up, affect each other, come into conflict or cooperate. This space is not static, not a cross-section through time; it is disrupted, active and generative. It is not a closed system; it is constantly, as space-time, being made (Massey, 1999:274).

INTRODUCTION
The documentation and analysis of the catalyst for - and outcomes of - the extension of the geoarchaeological research described in Section I of this thesis into ‘contemporary practice(s)’, particularly environmental and cultural resource management has been the primary focus of Section II. This focus emerged out of the author’s participant activism in court proceedings relating to threats to elements of the Aboriginal cultural heritage resource of northern Deception Bay. This chapter provides a brief discussion and overview of the key outcomes of this emergent research focus and considers some wider implications for such research.

COGNITIVE OWNERSHIP
A key outcome of the primarily qualitative research documented in Section II is the identification, description and application of the term ‘cognitive ownership’ as a means to broaden understandings of cultural heritage places. The term emerged out of my attempts to evaluate the multiple meanings, values and relationships to place held by all parties engaged in a land use conflict within northern Deception Bay. In its application to the Beachmere case study the term has been demonstrated to be an enabling notion that allows the recognition, description and exploration of the multiple meanings and/or values ascribed to places without the need to assess the validity of these meanings and values. In publications where co-authors have highlighted the wider application of the term to a range of cultural heritage locations the notion of cognitive ownership has achieved international recognition (e.g. Mathers et al., 2005) and found application in cultural geography (e.g. Ellemor, 1998) and Aboriginal archaeological / cultural heritage management studies (e.g. Smith & Bourke, 2001).

LANDSCAPE READINGS
Another key outcome of this section of the research has been the documentation of the historically contingent nature of the attribution of meanings and values in landscape, and the perhaps inevitable consequences for heritage of such historical attribution. Using historical, ethnographic and contemporary data sources the multi-vocal nature of the landscape of
Deception Bay as, at its opposing extremes, either a nourishing Aboriginal terrain or a disagreeable swamp, has been shown. Moreover, with reference to colonial and post-colonial discourses the ways in which the continuous renegotiation of space as contested terrain may work to marginalise landscapes and minimise Aboriginal cultural heritage values embedded within them has also been demonstrated.

ACCIDENTS OF PRESENT
The outcomes described for Section II fundamentally derive from my negotiation of an ‘accidental present’ and the more situated, self-reflexive exploration of the cultural landscape of northern Deception Bay afforded me through my own ‘participant activism’. One of the more recent and interesting intersections of time and place in this research journey occurred when in 2005 I was sought out by the granddaughter of Kal-Ma-Kuta. Of course, the irony of her stated genealogy in the context of Kal-Ma-Kuta’s memorialisation as the ‘last of her tribe’ (as described in Chapter 14) was (is) immediately noteworthy. Equally noteworthy was the fact that despite my prior public involvement in Aboriginal cultural heritage issues within northern Deception Bay this was my first contact with her. By birthright, she might have been expected to make some claim to ownership of the cultural heritage that was disputed at Court in 1995, but this was not, at least overtly, the case. Her lack of participation in this prior dispute reflects another element of cognitive ownership that requires further exploration. What are the cognitive limits of perceived threats and personal attributions of importance and risk that influence claims of ownership and/or involvement in contested terrains? Significantly, Kal-Ma-Kuta’s granddaughter became active in consideration of cultural heritage matters within northern Deception Bay when road upgrades on the Caboolture to Bribie Island Road, near Ningi, specifically threatened the monument to her grandmother (and see Reid, 2006 for example of the impacts of upgrades to this road on other Aboriginal cultural heritage values within the area).

In writing of this happenstance, it is important to recognise the time elapsed since the court proceedings from which the ideas and analyses recounted in Section II were developed. This is because sustained development pressure and concomitant infrastructure upgrades, such as the road works referred to above, has continued to alter the cultural landscape of northern Deception Bay. Thus, for example, when I commenced my investigations in the area the Toorbul Point Bora Ring was physically linked to the large Melaleuca swamp referred to throughout this thesis as Ningi Swamp, via a natural vegetation corridor. It is now a small fenced Reserve fronted on all sides by a housing development. Equally, all of the area immediately to the north and east of the Sandstone Point Aboriginal Reserve is now residential estate whereas it was largely undeveloped. The pragmatics enabling individual sites such as the Toorbul Point Bora Ring and the Sandstone Point Midden Complex to remain in situ, in a
region subject to significant and ongoing development pressure, has resulted in an increasing separation of each site from the wider nourishing Aboriginal cultural terrain from within which it emerged. Moreover, with the exception of pure geographic location, the landscape contexts and linkages between these cultural heritage sites has become increasingly fragmented through urban development. Thus, although elements of the Aboriginal cultural landscape are being preserved, the fragmented nature of this preservation can be seen as a continuance of the marginalisation of the Aboriginal cultural heritage values of this landscape, a marginalisation with a powerful, historically contingent, agency.

From these observations comes the need to acknowledge that my participant activism – though yielding theoretical concepts such as cognitive ownership as a tool for better management of cultural heritage places – has had little practical on-ground impact on the management and preservation of the Aboriginal cultural heritage landscape of Deception Bay. Whilst I would argue that this is a direct result of the powerful agency and historicity of marginalisation of this landscape I also would defer to Maxey (1999) and state that I have attempted to do as much as I can [could] from ‘where I am [was] at’ and thereby emphasise ‘the provisional, ongoing nature of engaged critical reflexivity’. I remain timid but value Maxey’s assertion that “once we are able to celebrate the value of our contingent flawed efforts, we will be far freer to add our next contribution to the conversation” (Maxey, 1999:206).

CONTINUING THE CONVERSATION

There is ongoing relevance of and challenges for the use of the notion of cognitive ownership in jurisdictions and management frameworks beyond the point of origin of the term. As I write this chapter I am currently working as a regional archaeologist for the Department of Environment, Climate Change and Water (DECCW) in New South Wales (NSW). In past months community based forums focused on Aboriginal community consultation in the regulatory processes supporting the Aboriginal cultural heritage provisions of the NSW National Parks & Wildlife Act (1974) have been conducted by DECCW. The specific subject of these forums is outlined in Discussion Paper: Reviewing the Interim Community Consultation Requirements for Applicants for Aboriginal Heritage Impact permits (Department of Environment and Climate Change, 2007). Due to both industry and Aboriginal community concerns this review is an effort to reform current circumstances wherein, for example, in the Hunter Region where coal mining is a significant and still expanding industry, up to 30 Aboriginal groups have registered an interest in being consulted about an Aboriginal heritage place subject to development. In current practice DECCW makes no distinction and requires that consultation occurs with all whom register an interest. This has caused cost related concerns for industry and worried Aboriginal traditional owners that people not from Country could/can be part of the decision-making processes about their heritage. The key discussion points specifically oriented at the Aboriginal
community have been about the nature, type and possible hierarchical evaluation of cultural knowledge and to who should a proponent speak to achieve effective understanding of the full range of cultural knowledge(s) available about a heritage place. In particular, the discussion paper is focused on describing traditional, historic and/or contemporary knowledge(s) and asks the Aboriginal community whether consultation should occur for each and/or all of these types of knowledge. In addition, the discussion paper asks whether consultation should remain open as in the current framework or whether it should be based on specific knowledge(s) and or restricted to specific groups such as Elders and/or Traditional Owners.

A cognitive ownership approach applied to the standard scenario of such a regulatory process would be inclusiveness of viewpoint without immediate judgement of the nature of the knowledge, its value, or its specific source. In the pragmatics of policy development, the challenges to achieve workable, cost-effective and community supported Aboriginal consultation may impinge on such inclusiveness. The further resolution of the notion of cognitive ownership such that its theoretical merits are enabled in the practical spheres of cultural heritage policy development is a key and necessary area for future research.

It is also in the ongoing consideration of the representation and protection of heritage that key concepts described and illustrated in Section II, with reference to Deception Bay, – namely the notion of cognitive ownership, colonial and post-colonial discourses and heritage as text – are most relevant. I wish to exemplify this below with a brief personal anecdote derived recently whilst working in a heritage research capacity within northwest New South Wales.

Near the Barwon River just west of Walgett, during recent bridge construction works a group of scarred trees were removed from their in situ riverbank location and relocated to a roadside viewing area adjacent to the river. When I first encountered this site, I was struck by a sense of an ignoble aesthetic because at the bottom of two canary-yellow coloured, relatively tight-weaved, mesh cages lay several sawn portions of trees with obvious scarring. The cages were tall and rectangular and, at a height above my eye-line, several small slits had been cut in the mesh as likely viewing holes. I did not like the colour or proportion of the cages, I did not especially like that they were cages, and without any signage, the tourist value of the site did not seem to be well realised. This was particularly so as the site was located at the point of a bend in a road where the general road signage indicated the need to turn sharply left, rather than to progress straight ahead as is actually required to access the site.

These were some of my first observations or readings of this ‘text’. Without any commentary on the cultural heritage assessment processes that achieved this protection option for these scarred trees, I wish to move beyond my sense of the ignoble and highlight a variant observation made
to me by a local Aboriginal man that more poignantly highlights the need to understand and explore the multiple meanings in heritage and its representation. When I noted my discontent that the trees were contained in cages, this man immediately stated that he did not like it either and stated that the trees were “brothers’ doin’ time”. This short phrase is powerfully evocative and encapsulates for me a ‘slap in the face’ for my pretence of affront at an ignoble aesthetic. For this man these trees are brothers, and as brothers, they are experiencing what is, an all too frequent occurrence for Aboriginal men in Australian society; imprisonment. It is a ‘slap in the face’ that is warranted and that in my recoil requires of me the continued pursuit of wider understandings of the meanings in heritage enabled by the term cognitive ownership and facilitated by post-colonial discourse analysis and the reading of heritage and landscape as text. It requires of me to accept Maxey’s (1999) challenge of critical reflexivity and to maintain the willingness to continue the conversation…

EMERGENT RESEARCH

There are no manuals or guidebooks on the practice of Transdisciplinarity. Indeed, the manifest elasticity of the term “transdisciplinarity” precludes a “how to” analysis. McMichael, 2000:15).

In order to continue the conversation alluded to above, maintenance of an active awareness and positive engagement with current and emerging academic research is vital. In concluding this Section of the thesis I wish to comment on two aspects of current academic endeavour that offer the potential to: (a) further inform and expand understandings of the physical and perceptual values of landscape and/or (b) better enable the iteration of the likely consequences of these values for the conservation and management of Indigenous cultural heritage. The first of these is the very recent burgeoning of scholarly literature focused on the theory and praxis of transdisciplinary research (e.g. Kueffer et al., 2006; Wickson, et al., 2006; Hirsch Hordon, et al.,2008a;b; Pohl, 2008; Pohl & Hirsch Hordon, 2008; Russell, et al., 2008 cf. McMichael 2000). In spatio-temporal terms this florescence of transdisciplinary scholarship is coincident with the movement of my research from beyond the immediate ‘action sphere’ of participant activism (as related in Chapters 10 and 11) to the self-reflexive analysis of this activism (Chapter 12) and wider reflection on its meanings and consequences (Chapters 13-15). Recent articulation of the three key elements of transdisciplinary research (i.e. problem focus, evolving methodology, and collaboration) (Wickson, et al., 2006; Russell, et al., 2008) has served to (a) affirm the validity of the multi-modal methodological approach adopted in this thesis, and (b) provide support for the emergent and self-reflexive structuring of it. In turn my explication of the multi-vocalities of the cultural landscape of Deception Bay, using an intuitively transdisciplinary approach, demonstrates the ongoing merit of such research in landscape studies. Nevertheless transdisciplinary research theorists have acknowledged that challenges remain in refining universal schema with which to evaluate the effectiveness of the integrative
processes adopted in practical transdisciplinary research programmes oriented at “tackling real world problems, in multi-actor contexts” (Wickson, et al., 2006; Krohn, 2008; Pohl et al., 2008). In the absence of such schema, my research is most valuable as transdisciplinary praxis: a functional example of the integrative approach adopted by a lone researcher in her attempt to explain the intrinsic complexities of a contested cultural terrain, using multiple modes of enquiry (Pohl et al., 2008).

Likewise, there has been recent emphasis within geographic and anthropologic literature placed on the examination of the cultural contexts of historic and contemporary vegetation change in urban, rural and forested environments (e.g. Fry, 2001; Butzer & Helgren, 2005; Smith, 2005; Head & Muir, 2006a, b; O’Brien, 2006; Jorgensen & Tylecote, 2007; Lowenthal, 2007). A focus of this research has been on the interrogation of the role of divergent values and personal aesthetics in the shaping and/or reshaping of vegetated spaces (O’Rourke, 2005; O’Brien, 2006; Head & Muir, 2006a,b); and the critical importance of understanding the divergence of these ‘cultures of nature’ for improved environmental management and landuse planning (Head et al., 2005). With the use of terms such as “interstitial wilderness”, “wasteland”, “rural aesthetic” “invasive species” “urban ecology’ and “bounded nature” this emerging national and international literature (O’Rourke, 2005; Head & Muir, 2006a, b; O’Brien, 2006; Jorgensen & Tylecote, 2007; Lowenthal, 2007) echoes the themes explored in this thesis in the examination of the multiple meanings afforded to both the native vegetation and exotic pine trees within Deception Bay; and suggests that this aspect of my research has relevance in wider environmental management and land-use planning contexts.
CHAPTER 17

THESIS OVERVIEW

Cotter, M.M.
*School of Environmental Science and Management, Southern Cross University, Lismore, NSW.*

Unpublished manuscript

2008

**Concept and design of research**

Concept and research design Cotter, M.M.

**Collection, analysis and interpretation of data**

Collection, analysis and interpretation of data Cotter, M.M.

**Writing**

Writing, proof reading and edits: Cotter, M.M.
CHAPTER 17

THESIS OVERVIEW

INTRODUCTION

The landscape is its own subject, has its own rhythms and seasons and is active in shaping those who live in it in this way. It is an intersubjective experience, involving networks of relationships with others that are both practical and embodied, dangerous and benign…

It is about childhood playfulness, about loss of self in flowers; a love of country and the knowledge of landscape without hierarchy, including indigenous, scientific and folk knowings. (Somerville, 2004:231).

MULTI-VOCALITY OF LANDSCAPE

In October 2004, I attended the launch of the book *Wildflowering: The life and places of Kathleen McArthur* from which the above quotation is drawn. Like this thesis ‘Wildflowering’ is a book about the talking together of time and place with the action space of this dialogue being the wallum country of southeast Queensland, especially the coast and hinterland areas of Pumicestone Passage in northern Moreton Bay. Within the book the lived experiences of Kathleen McArthur, a pioneer of environmental activism in Queensland, – whether as floral artist documenting wallum vegetation communities or as an author writing about the waters of Pumicestone Passage – are described in terms of her personal intimacies with and knowledge(s) of this wallum landscape.

With hindsight, my attendance at this book launch and its happenstance in the context of the non-linear development of this thesis is both a reflection of – and catalyst for – a further expansion of my understandings of the interconnections between people and place, and the particular expression of these interconnections within the ‘wallum’ landscape of southeast Queensland. In the prologue to this thesis it is the contemplation of the intimacies in place described, interpreted and (re) negotiated for Stradbroke Island by Oodgeroo Noonuccal that allows the identification of Moreton Bay as a locale with a plurality of coda through which cultural identity can be framed. For Oodgeroo this cultural identity is Aboriginal. Kathleen McArthur’s genealogical heritage precludes the codification for her in landscape of an Aboriginal identity; nevertheless, like Oodgeroo the wallum landscape affords her a cultural identity as activist and authoress. Indeed, prior to ‘Wildflowering’ I have been most familiar with Kathleen as the authoress of a book on Pumicestone Passage, a book that I have owned for some twenty years.

Oodgeroo Noonuccal and Kathleen McArthur are women not of my generation or of my place. They are also sadly no longer of my time. Yet their separate talking together of time and space
and the coalescence of these talking(s) as a shared expression and linked knowledge of the wallum landscapes of Moreton Bay has served to frame my negotiation of a research identity within this same landscape. In the first instance, I have recognised that their intimacies in landscape have derived from their living within and being both actually and perceptually a part of this landscape. As such, and especially in the context of my participant activism I have recognised myself to be not of but ‘other’ in this landscape. In addition, I have drawn from Oodgeroo’s poetry of time and place and employed her phrase “this accidental present” as a referential metaphor to describe and reflect the context and action of my research; and to acknowledge the situatedness of my knowledge(s). Furthermore, I have recognised that both women understood that there are different ways of understanding Wallum country and of being in ‘this little now’. It is the strength of collective example in their individual and personalised recognitions of multiple readings of landscape, and their activism in their personal moments of present, that has given wider confidence and focus to this thesis. In the writing and/or actions and/or commentaries on the lives of these two women (e.g. Cochrane, 1994; Somerville 2004) there is a shared message that within the wallum landscape indigenous, scientific and folk knowings can coalesce without hierarchy to form multiple points of intersection between people and place. In this thesis, I have drawn strongly upon this message of multiple non-hierarchical ways of knowing landscape and used both quantitative and qualitative methods in order to explicate more fully the time–place relationships implicit in the cultural landscape of northern Deception Bay, southeast Queensland

A MULTI-MODAL EXPLORATION OF LANDSCAPE

The Passage is the liminal expressed in landscape a space of the in-between (Somerville, 2004:180).

This thesis, like Pumicestone Passage, occupies a liminal in-between space, a research space in which the nexus between positivist science, as geoarchaeology, and more humanist / social science forms of enquiry has been invoked in order to explicate more fully the time–place relationships implicit in the cultural landscape of northern Deception Bay. This invocation – in the context of an emergent and hence necessarily flexible research framework– has brought together three separate loci of research:

1. The scientific evaluation of the physical landscape of northern Deception Bay in order to explicate questions about the Aboriginal archaeological record of the area;

2. The exploration of the social construction of places within Deception Bay, particularly in the context of a contested terrain; and the implications of these social constructions for understanding and management of the Aboriginal cultural heritage values contained within this landscape
3. The self-reflexive evaluation of the situatedness of the quantitative and qualitative research endeavour including the documentation and acknowledgment of the research apprenticeship.

The first locus of research, which for brevity I state to be the scientific evaluation of physical landscape elements of northern Deception Bay, is documented in Section 1 of this thesis and complemented in the technical reports found in the Appendices of Volume II. At its most basic level, the development and refinement of a model for coastal evolution within Deception Bay spanning the last 6000 years or so, as has been achieved using multiple lines of scientific enquiry, provides a valuable long-term understanding of the spatial and temporal context of the current physical landscape of Deception Bay. Where analysis has been expanded to consider the archaeological implications of environmental flux within Deception Bay – as for example in the derivation of an environmental explanation for the absence of a dated archaeological record older than about 2500 years within this coastal plain – a recognition of the complexity of time-space relationships in the human-environment interactions that have occurred within Deception Bay has also been achieved.

The second locus of research, the consideration of the social constructions of place as highlighted in the contestation of Aboriginal cultural heritage resource values within the coastal plain of Deception Bay, is documented and explored in Section II of this thesis. This research locus though firmly embedded within the contemporary socio-cultural and socio-political realm, is a locus that commenced with my attempts to place the scientifically derived knowledge of the environmental and archaeological record of Deception Bay within the public sphere of a landuse conflict. It, however, quickly moved beyond the intersection of science with contemporary social action to consider the historicity of place meanings and value and to explore the multivocality of landscape(s) and the cultural heritage resources that they may contain. The major achievement of this research locus is the identification of the historical contingencies in the social construction of landscape meanings within Deception Bay, and the acknowledgement of the inherent validity of multiple ways of knowing and deriving cultural meaning within this landscape. Focusing on the Aboriginal cultural heritage of northern Deception Bay, this research locus has expounded the notion of cognitive ownership in order to explore the multiple points of intersection between people and place especially where the place in question is, like Deception Bay, a landscape imbued with cultural meaning and value.

The third locus of research, the evaluation of the agency of the researcher in the derivation of data and outcomes, is not documented solely within one Section or one chapter of this thesis, but rather is more diffusely presented throughout. This locus of research has enabled the
situation of the research within the liminal in-between space offered but not always explored in landscape archaeologies. It has enabled the recognition of historical contingency and contemporary practice; and if the truth is baldly applied, it has enabled a contribution that is not research but that is of practice and of shared knowing in this wallum landscape.

ELEMENTS OF DECEPTION

This thesis, as the structured outcome of the coalescence of the three loci of research described above represents my research contribution, to the archaeology of southeast Queensland, in particular, and coastal archaeology in Australia more generally. It also represents my contribution to the study of coastal geomorphology especially in relation to the development of our understanding of the influences at the sub-regional level of sea-level change on shoreline development and vegetation community flux. Equally, it represents my contribution to cultural landscape studies both in the context of geoarchaeological research and in the context of the assessment of the cultural heritage values of contested places. It also represents a contribution to the emerging engagement of cultural geography with natural resource management through the development of the notion of cognitive ownership as a means of accommodation of multiple viewpoints and values in landscape. Finally, through its emphasis on the iteration and recursive development of different knowledges pertaining to the landscape of Deception Bay, as derived from the quantitative and qualitative research endeavours of a lone researcher, it also represents my contribution to the developing theory and emerging praxis of transdisciplinary research.

These practical and theoretical contributions are now mediated from being further actions in place by my current geographical distance from Deception Bay. Nevertheless, the Epilogue to follow provides a final reflection on how and where this research might continue.
THESIS EPILOGUE: ‘THIS LITTLE NOW’

INTRODUCTION

In concluding this thesis I wish to return to its beginning and once more reflect on the universal ‘talking together’ of time and place; and once again use poetry as the vehicle through which to do so. However in this ‘little now’, a cool mid autumn evening in Armidale, the poetry I choose to use in this reflection is my own and not that of Oodgeroo Noonuccal. In the poem Childhood and cicadas (see overleaf) I wrote two years ago of a vivid childhood memory of discovering the ‘magic’ of nature in my own backyard. The memory is vivid for its colours and warm for the fond recollection I have of sharing the discovery with my mother. As I recall it, one late spring or early summer morning, when I was about eight years old I brought a hatchling ‘black princess’ cicada nymph home to show my mother. Unlike my growing collection of cicada nymph carapaces this nymph was special as it was alive. My mother encouraged me to place it on the trunk of a small apple tree in our backyard so as to both allow it to and to watch it hatch. I did not watch over it exclusively but remember my repeated delight when over a period - that I recall extended over some hours - I would return to check on the progress of the hatching and at each time so much new was revealed to me. Each new revelation would mean a call to my mum to come and have another look at the changing cicada. I remember my mother’s patience, her gentle encouragement and her lessons in observation as I was to watch but not touch nor harm the animal on its journey into adulthood. This poem is accompanied by a photograph of my youngest daughter Elian taken in her backyard last spring as the magic of cicadas was revealed to her for the first time. Her backyard is of course mine too and some thirty years on from my childhood experiences time and place “talked together” last spring to merge what was previously as poetry a mere reflection on my childhood with my present as a newly shared experience with my daughter.

Here then is one small example of where the nexus between nature and culture enfolds. My mother’s nurturing of my serendipitous engagement with nature, and my recent repetition of this nurturing with my own daughter is now part of a created (and re-created) family folklore that is embedded within the wider cultural frameworks of my Anglo Australian heritage. Likewise the negotiation of my engagement with the natural world through the medium of poetry whilst immediately personal is very much part of long standing cultural traditions in literate societies. In the self reflexive gaze of the poem Childhood and cicadas nature is, for me, ‘observable magic’ replete with change. More importantly, the time, the place and the referential space of the observer (me) are critical to the understanding of this change and the hindsight placement of these observations within my cultural framework as childhood recollection.

I make these remarks in consideration once more of the challenge posed by Head (2000a) to creatively use the tensions between nature and culture so as to more clearly see where we stand in space and
time; and to better resolve our understanding of cultural landscapes. In each case, it must be acknowledged that the clarity of view is dependent on the willingness of the individual to begin the journey across the divide, and the scholarly and practical room afforded the individual to do so. This thesis is at the contemplative edge rather than at the defining endpoint of such a journey. The research presented sits as a functional example of my efforts to create the nexus between positivist science, - as geoarchaeology – and more humanist / social science forms of enquiry through an analysis of the social construction of Indigenous heritage within the landscape of Deception Bay. Yet, just as the poem *Childhood and cicadas* is a ‘revel in serendipity’ I am conscious of the many convergent ‘accidental presents’ that have resulted in this thesis and assert that this work is an integral part of a larger “shared world of connections and differences” (Waitt *et al*., 2006). Hence the longer term effectiveness of the research, in part, remains dependent on my continuing negotiation and renegotiation of the non-dualistic relational connections, differences and spaces between that articulate as the ‘borderlands’ of the nature – culture divide. The challenge therefore continues.

*Childhood and Cicadas*

summer din and blue-sky rain
intoxicating hazes of heat and eucalypt
dry sclerophyllous winds exciting a
mad scribbly gum chorus

a collection of brown paper carapaces
fragile, crisp and magically grotesque
counting them, one by one, as nature’s trophy
marks of summer, of season, and of other life

a wide eyed innocent
awed by the castaway shells
of fleeting insects…

and once,
enraptured by the magic embrace
of change…

as a nymph revealed
the rainbow shimmer of mirrored light
as first white and wet,
then emerald green,
pink ruby and cerulean blue
black princess wings emerged
from her drab, brown thorax

to dry in a sapping sun and prepare
to dance and sing the shortest,
brightest summer song

and to fly the breeze of gentle mystery
as I at eight was brought to revel
in serendipity and to gaze upon the secret,
other world, of cicadas.

VOLUME 1 REFERENCES

THESIS EXPLANATION & PROLOGUE


Noonucal, 0. 1990a. *Australian Legends and Landscapes.* Random House, Australia.


**SECTION I**

**INTRODUCTION**


pp.455.

Hudak, C. 1993. Guidelines for geomorphological investigations in support of archaeological investigations in

Monuments and Historic Buildings, Occasional Paper No. 6, Department of the Environment, London.

University Press, New Haven.


W.C. (eds), Moreton Bay and Catchment, p79. School of Marine Science, University of Queensland,
Brisbane.

**CHAPTER 1**

to the Australian Heritage Commission, Canberra, ACT.


Alfredson, G. 1984. The Aboriginal use of St Helena Island, Moreton Bay —The Archaeological Evidence. In In
Coleman, R.J., Covacevich, J. & Davie, D. (eds.) Focus on Stradbroke, Boolarong Publications,
Brisbane, pp.1-8.


Attenbrow, V. 1982. The archaeology of Upper Mangrove Creek catchment: research in progress: In Bowdler, S.
prehistory, pp67-78. Department of Prehistory, Research School of Pacific Studies, Australian national
university, Canberra.

Attenbrow, V. 2004. What’s Changing: Population size or land-use patterns: The archaeology of Upper
and Asian Studies, The Australian National University, Canberra.

Queensland Archaeological Research 6: 53-76.


Barker, B. 2004. The sea people: Late Holocene maritime specialisation in the Whitsunday islands, central
Queensland. Terra Australis, Vol. 20. Pandanus Books, Research School of Pacific and Asian Studies,
The Australian National University, Canberra.

Beaton, J. 1983, Does Intensification account for changes in the Australian Holocene Record? Archaeology in
Oceania: 18: 94-97.

Beaton, J. 1985. Evidence for a coastal occupation time-lag at Princes Charlotte Bay (North Queensland) and


Bonica, C. 1992. A technological analysis of the lithic assemblage from Christmas Creek Rockshelter, Southeast Queensland. Unpublished BA (Hons Thesis Department of Anthropology and Sociology, University of Queensland, St Lucia, Brisbane.


Butler, D. 1994. Vegetation history and environmental inferences from Quaternary sediments at Currimundi, coastal southeast Queensland, Unpublished BSc (Hons). Thesis, University of Queensland, St Lucia, Brisbane


287


Nique, P. & Hartenstein, W., 1841. The Aborigines, Diary of Messrs, Nique and Hartenstein of the German Mission to the Aborigines, at Moreton Bay, during a journey to Toorbal, a district of country to the Northward *The Colonial Observer*, 1(4), pp. 27.
Nolan, A. 1986. Sandstone Point: temporal and spatial patterns of Aboriginal site use at a midden complex, south east Queensland. B.A.(Hons) Thesis, Department of Anthropology and Sociology, University of Queensland, St Lucia, Brisbane.


Peters, R. 1990. Emu swamp – from glaciation to ‘‘grassed plains: vegetation history and landuse conflict at Emu Swamp, Sunshine Coast, Queensland, Unpublished Integrated project thesis, University of New England-Northern Rivers, Lismore, NSW.


**CHAPTER 2**


**CHAPTER 3**


Naylor, S. 1993. Draft environmental guidelines for the assessment and management of coastal land developments in areas of acid sulphate soils. Environmental Protection Authority, Grafton, NSW.

Nolan, A. 1986. Sandstone Point: temporal and spatial patterns of Aboriginal site use at a midden complex, southeast Queensland. B.A. (Hons.) Thesis, Department of Anthropology and Sociology, University of Queensland, St Lucia, Brisbane, Queensland.


CHAPTER 4


300


Nolan, A. 1986. Sandstone Point: temporal and spatial patterns of Aboriginal site use at a midden complex, southeast Queensland. B.A. (Hons.) Thesis, Department of Anthropology and Sociology, University of Queensland, St Lucia, Brisbane, Queensland.


**CHAPTER 5**


Peters, R. 1990. Emu Swamp - From Glaciation to "Grassed Plains": Vegetation history and landuse conflict at Emu Swamp, sunshine Coast, Queensland. Unpublished 3rd Year Integrated Project Report, University of New England - Northern Rivers, Lismore

**CHAPTER 6**


**CHAPTER 7**


**CHAPTER 8**


**CHAPTER 9**


**SECTION II**
INTRODUCTION


CHAPTER 10


Department of Geographic Information, 1988. Queensland 1:25 000 Map Series, Sheet 9543-44 Toorbul (Provisional).


**CHAPTER 11**


Ellis, B. 1994. Rethinking the paradigm. Cultural heritage management in Queensland. *Ngulaig*. Vol 10, Aboriginal and Torres Strait Islander Studies Unit, University of Queensland, St Lucia.


Hughes, P.J. and Sullivan, M.E. 1984. Environmental approaches to assessing archaeological significance. In Sullivan, S and Bowdler, S. (eds) Site surveys and significance assessment in Australian archaeology, Department of Prehistory, Research School of Pacific Studies, Australian National University, Canberra, p. 34-47.

Langevad, G. 1979. The Simpson Letterbook. Cultural and Historical Records of Queensland, Number 1, University of Queensland Press, St Lucia.


**CHAPTER 12**


Ellis, B. 1994. Rethinking the paradigm. Cultural heritage management in Queensland. Ngulaig. Vol 10, Aboriginal and Torres Strait Islander Studies Unit, University of Queensland, St Lucia.


**CHAPTER 13**


**CHAPTER 14**


Field B. (ed), 1825. *Geographical memoirs on New South Wales: by various hands : together with other papers on the Aborigines, the geology, the botany, the timber, the astronomy, and the meteorology of New South Wales and Van Diemen’s Land.* John Murray, London.


Hawkesworth, J. 1773. (Ed.) *An account of the Voyages undertaken by order of his present majesty for making discoveries in the Southern Hemisphere, and successively performed by Commodore Byron, Captain Wallis, Captain Cateret, And Captain Cook.* (Williams, 1997:XXX).


Oxley, J. 1825. Report of an expedition to survey Port Curtis, Moreton Bay and Port Bowen, with a view to form penal settlements there in pursuance of the recommendations of the Commissioner of Inquiry into the Colony of New South Wales. In Barron Field (ed), *Geographical memoirs on New South Wales: by various hands: together with other papers on the Aborigines, the geology, the botany, the timber, the astronomy, and the meteorology of New South Wales and Van Diemen's Land*. John Murray, London, pp. 1-26.


Uniake, J. 1825. Narrative of Mr Oxley’s expedition to survey Port Curtis and Moreton Bay, with a view to form Convict Establishments there, in pursuance of the recommendations of the Commission of Inquiry. In Barron Field (ed), *Geographical memoirs on New South Wales: by various hands: together with other papers on the Aborigines, the geology, the botany, the timber, the astronomy, and the meteorology of New South Wales and Van Diemen's Land*. John Murray, London, pp. 27-86.


CHAPTER 15


**CHAPTER 16**


CHAPTER 17


EPilogue
