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The Potential for Change in Late Holocene Economic and Social Systems

It has been suggested that archaeological evidence for significant economic, demographic and technological variation in response to continuing environmental and cultural change implies that recent observations of Aboriginal Australian activities in the contemporary landscape may make poor analogues for the economic strategies that were in place at earlier times (Hiscock 1999:101; Faulkner 2009). Regardless of the explanatory frameworks used by researchers in coastal northern Australia, be they ecological or socio-cultural in orientation, interpretations of the archaeological record have drawn heavily on ethnographic analogies to directly explain economic and social systems of the late Holocene. This vast area has seen several successive phases of social and economic change following culture contact with both Macassans and Europeans during the historic period (Thomson 1957; Schrire 1972; Clarke 1994; Mitchell 1994a, 1994b), making it inappropriate to indiscriminately apply ethnographic models to the interpretation of prehistoric sites.

The use of ethnographic models within such a context has likely resulted in a reduced recognition of the nature and extent of behavioural variability that may well have existed throughout the late Holocene. The suggestion made here, therefore, is that the degree of change and variability in late Holocene Aboriginal societies has been markedly underestimated. Using archaeological evidence, this research addresses the question of how much change and variability occurred in economic and social systems during the late Holocene, focusing on a coastal area of the Blue Mud Bay region of northeastern Arnhem Land (Figure 1.1).

While some researchers have acknowledged that it is inappropriate to use ethnographic analogy in investigating aspects of human behaviour during the Pleistocene in Australia (see for example Cosgrove 1991), this is not the case for the Holocene. The fact that the north Australian Holocene coastal archaeological record has increasingly been characterised by economic and social variability across the broader region appears to be at odds with the direct use of ethnography, thereby accepting a certain level of cultural continuity and unidirectional development, not just through time, but across vast distances. This situation indicates that the direct use of ethnographic data in interpreting the coastal archaeological record for northern Australia may be inappropriate, and that the archaeological record from this period requires reconsideration.

In discussing elements of change and variability in the archaeological record over the long-term, the main aspects considered here involve assessing potential variability in human behaviour relative to climatic and ecological parameters, as well as examining issues of scale and resolution in archaeological

interpretation. As has been noted by Bailey (1981a:13), in attempting to explain long-term economic change, emphasis should be placed on the analysis of time trends in prehistoric resource exploitation. In an archaeological study of this type, therefore, the analysis of relative changes and trends over time in patterns of resource utilisation and their relationship to environmental factors are important considerations. When investigating chronological trends in economic and social patterns in the past, before debating the mechanisms driving that change, the initial step should be to rigorously assess the relationship (if any) between environmental and climatic changes and human behaviour.

This is particularly relevant for the archaeological record of coastal northern Australia, dominated by shell deposits, and often referred to as primarily reflecting economic structures positioned within a constantly shifting landscape (Mowat 1995; Bourke 2000). For this reason, and in line with proponents of environmental-ecological approaches, this research seeks to examine the *interaction* of cultural and environmental processes (Veth *et al.* 2000:58). While change in the environment is seen here as a catalyst for economic and technological reorganisation, the particular behavioural strategies that may follow environmental shifts are not necessarily determined by them, and are not considered to automatically flow on as a direct consequence of environmental or climatic change.

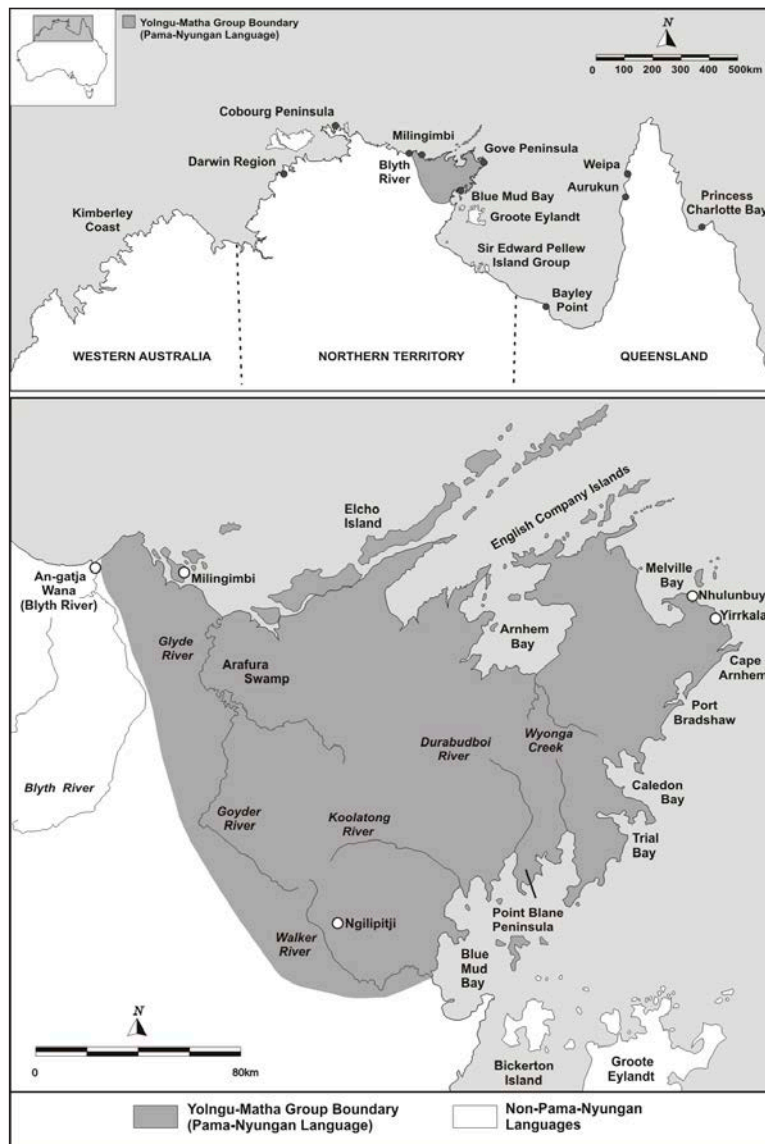


Figure 1.1: North Australian locations mentioned in the text.

Source: Modified from Bourke 2000 and F. Morphy 2004.

A number of researchers have criticised this type of approach as being simplistic and overtly deterministic (see for example Lourandos and Ross 1994; Lourandos 1997; Barker 1999, 2004; McNiven 1999), and some have dismissed late Holocene environmental conditions as a factor contributing to economic and social changes during this period. Instead, these researchers prefer to advocate primacy to socio-cultural processes as causal mechanisms for change. In fact, while these researchers view trends in the archaeological record as indicating that Aboriginal culture has been changing and intensifying over a long period of time, their models tend to be linear, unidirectional and ethnographically based. Rather than being a holistic and integrated model, as has been advocated by Morrison (2003, 2010), this approach is too simplistic, as it removes the structure within which humans, and particularly hunter-gatherers, must operate. For example, Lourandos and Ross (1994:60) have stated that the more recent changes of the historic period are simply a continuation of a tradition that goes back thousands of years. In many respects, this creates interpretations based on social or cultural determinism (e.g. Rowland 1999a:12), a situation as problematic as environmental determinism.

The environment provides the framework that people have to live within, but it is how people structure their economic and social activities within that framework, depending on the configuration and availability of given resources, that promotes change and variability through time. Based on archaeological research carried out since the early to mid 1990s (particularly Clarke 1994 and Mitchell 1994a, 1994b, 1995, 1996), it has been accepted that there have been several phases of change in northern Australia within the historic period, primarily due to processes of culture contact. These include the introduction of new technologies and a shifting resource focus, changes in mobility, group sizes and patterns of settlement, as well as increased ceremonial activity, trade and exchange. It is therefore clear that culture contact introduced external elements acting to stimulate change, as those changes that occurred during this period cannot be described as being driven only via internal processes. While recent research into culture contact and its effects on Aboriginal societies has stressed that the nature of this process was interactive, rather than deterministic, there is potentially no need to separate contact from other environmental or external factors. In effect, the process of contact provided people with opportunities to modify aspects of their social and economic structure. By extension, earlier pre-contact processes of human-environment interaction can be described in a broadly similar way. This suggests that human-environmental interactions are complex, in part because the environment is highly variable rather than static. People were therefore working within a framework that was constantly shifting, but not necessarily unidirectionally. In adopting this approach, possible multidirectional, non-linear changes in Aboriginal economy and society may be recognised.

As the majority of archaeological studies to date from across northern Australia have used ethnographies as their primary interpretative framework (for exceptions see Mowat 1995; Hiscock 1999), it is important to note that the most frequently quoted ethnographic studies are those that were largely conducted in northeastern Arnhem Land between the 1920s and 1970s. These ethnographies are therefore a reflection of groups that had already experienced extensive contact with both the Macassans and Europeans. For this reason, it is necessary to examine how and to what extent these successive processes of contact may have altered the economic and social structures of Aboriginal groups in these areas prior to this recent period of observation. By examining the nature or extent of change and variability throughout the historic period, the use of ethnographic data to interpret the archaeological record and previous models of pre-contact change can be assessed.

Change and variability in the historic period: Culture contact

This overview of change and variability within Aboriginal social and economic systems during the historic period serves two purposes. Firstly, it demonstrates that significant change can occur within short time-frames as a direct result of human-environment interaction; and secondly, it establishes the framework within which to contextualise ethnographic observation. Archaeological and ethnographic data have been used to detail the degree and rate of change in coastal economic and settlement systems following Macassan contact on the Cobourg Peninsula in western Arnhem Land by Mitchell (1994a, 1994b), and in eastern Arnhem Land locations such as Caledon Bay, Port Bradshaw (White 1969, 1970; Schrire 1972) and Groote Eylandt (Clarke 1994). While it is now apparent that Macassan contact occurred prior to 1664 AD, and possibly earlier than 1517 AD, based on the radiocarbon dating of beeswax rock art designs (see Taçon *et al.* 2010), many of these researchers have found evidence from sites that were created after 1720 AD, when contact between Macassans and Aboriginal groups gradually intensified. These studies have demonstrated that there were significant modifications to settlement organisation and subsistence practices during this period. This has important consequences for the applicability of ethnographies relative to archaeological interpretations across much of the north Australian coast.

On the Cobourg Peninsula the size of post-contact middens were often substantially larger than those sites dating to the pre-contact period (Mitchell 1994a:377–98). Additionally, increased midden debris was not only visible near Macassan settlements, as originally predicted by Schrire (1972:664–6), but also in more remote locations. Mitchell (1994a:400) and Clarke (1994:465) have also demonstrated that Aboriginal groups began moving into new areas during the Macassan period, and that these sites contained a greater variety of exotic material and artefacts compared with both the pre-contact period and the subsequent Mission period. This suggests that Macassan contact had both direct, and indirect, effects on Aboriginal economy and society. Broad changes of this kind are therefore best explained as a shift in the entire regional settlement structure, rather than by the suggestion that the only change to hunter-gatherer patterns of settlement and mobility was foreign settlements becoming the main focal points, and landscape use elsewhere remained unchanged (Hiscock 1999:101). Instead, these changes in site location, size and content can be interpreted as representing increased residential group size and decreased residential mobility, with alterations in residential strategies reflecting a number of political, technological and economic changes (Clarke 1994:463; Mitchell 1994a:399).

This process of prolonged contact therefore had a profound influence on Aboriginal settlement. In fact, a series of inter-related economic changes underlie this reorganisation of coastal settlement in the post-contact period, as Macassan contact also led to changes in Aboriginal hunting and gathering practices (Mitchell 1994a, 1996). This evidence includes changes in the faunal composition in Indigenous sites on the Cobourg Peninsula, and ethnographic evidence from places such as Milingimbi, the Gove Peninsula, Groote Eylandt (Tindale 1925–6:93; Thomson 1957; Schrire 1972; Mitchell 1994a, 1996) and the Sir Edward Pellew Island group (Sim 2002; Sim and Wallis 2008). The introduction of dugout canoes and metal-tipped harpoons enabled more effective capture of large marine animals, such as turtle and dugong. New and/or improved technology thus influenced the higher level of exploitation of previously under-utilised resources. The dramatically increased exploitation of turtle and dugong, with the introduction of these new technologies often highlighted as a prime example of this process (Warner 1969:452). The adoption of the dugout canoe also increased the scale and efficiency of marine travel, providing the means to transport more food to a “base camp”, as well as increasing the foraging radius of a group. Mitchell (1994a:398) has described the advent of effective water craft as transforming residential patterns from a “forager” form (after Binford 1980) to a structure closer to a logistical pattern.

In addition to these modifications in resource exploitation and settlement patterns, Mitchell (1994b, 1995) has used archaeological evidence to demonstrate that contact with Macassans accelerated the scale and intensity of Indigenous exchange networks across the north. Other researchers have noted similar extensive trade and exchange networks in northern Australia (Davidson 1935; Jones and White 1988:57; Paton 1994; Evans and Jones 1997), all of whom highlight the possibility that many of these stone exchange networks developed relatively recently (Evans and Jones 1997). Several of the early ethnographers in the region, notably Warner (1969:452) and Thomson (1949:91), also make the case that the process of contact facilitated the development and expansion of trade and exchange networks, such as that originating from the Ngilipitji quarry. This quarry is located in the hills close to the upper Walker River on the mainland of eastern Arnhem Land. In the ethnographically recorded past, Ngilipitji was known throughout the whole of eastern Arnhem Land as the only major source of quartzite for the region. Artefacts from this quarry were circulated over a vast area; Thomson (1983:70) records having seen Ngilipitji spearheads in use as far south as the Roper River, and northward to the Goyder, as well as in Caledon Bay. The artefacts were distributed as part of a widespread system of ceremonial exchange (Thomson 1949:87), extending over an area of more than 80,000 km² (Thomson 1949:70; Jones and White 1988:57). Berndt (1951:171) and Thomson (1949:91) have argued that the extensive ceremonial and exchange networks of Arnhem Land intensified largely because of inland people seeking access to the new goods introduced via Macassan contact.

Art was also influenced during this time (Berndt 1965; Clarke 1994, 2000a, 2000b; Sim 2002; May *et al.* 2010; Taçon *et al.* 2010), as shown by stone arrangements depicting ships and processing sites, like those recorded on the Gove Peninsula (Macknight 1970:96; Macknight and Gray 1970). Warner (1969:444) has highlighted the northern diffusion of the “Kunapipi” (Gunabibi) ceremony as evidence for social change within the northeast Arnhem Land region (H. Morphy 2004:3). In addition, many Macassan words were adopted into local vocabularies, with a number of loan words reflecting the phenomenon of contact itself, which relates to processes and items of trade and exchange (Walker and Zorc 1981:111; McConvell 1990:22–3; Evans 1992; F. Morphy 2004:11–2;).

While the targeting of larger, energy-rich animal species and the enhanced trading system substantially reshaped the economy in the post-contact period (Hiscock 1999:101), the implications of contact for Aboriginal society in general were dramatic and far-reaching. While both Clarke (1994:465) and Mitchell (1994a:399) stress the point that the hunter-gatherer economy was not destroyed as a result of foreign contact, this process clearly had major consequences for Indigenous economic and social systems. Changes in settlement and subsistence patterns, ceremonial systems, trade and exchange networks and language are all indicative of a strategic and active response to Macassan contact that substantially reshaped Indigenous social and economic organisation. That Aboriginal people accepted selected features of foreign technology that conferred an advantage within traditional practice (Mitchell 1994a:400) highlights the interactive nature of this process, and emphasises the point that the process of contact provided the opportunity to modify advantageous aspects of their social and economic structure.

Following approximately 200 years of trade and contact with Macassans, the next major phase of change in Aboriginal economic and social systems in northeast Arnhem Land is associated with European contact, primarily the establishment of missions in the early twentieth century. Between the 1920s and early 1970s, the missions had an increasing impact on the settlement and subsistence patterns of Aboriginal people. For example, the Yolngu people of the Blue Mud Bay region left the area for the three relatively widely separated missions of Numbulwar, Groote Eylandt and Yirrkala, and at times during the 1950s and 1960s the bay was almost uninhabited as the majority of the population was concentrated into these mission settlements (Barber 2005:109).

Archaeological research on Groote Eylandt has highlighted a number of implications for Aboriginal economic systems associated with European contact during the Mission period (Clarke 1994; see also Turner 1974). Changes in subsistence practices during the period are seen in terms of a rational and strategic response to the problems posed by prolonged contact with European society. During this time, Aboriginal people acted to incorporate elements of their former subsistence practices into the new social and geographic contexts created by prolonged contact (Clarke 1994:462). As people became more settled within the missions, they had fewer opportunities for extended foraging; therefore, when the opportunities did arise, they targeted accessible and favoured bush foods (Clarke 1994:460). Consequently, midden sites examined on Groote Eylandt relating to this period consist of a limited number of taxa, all of which were available in the immediate environment. As a result of this process, these sites were seen to conform to the criteria outlined by Meehan (1988a) for 'dinner-time' or temporary camps (Clarke 1994:458). People presumably operated within a dual subsistence system: one that had a commodity-based component involving the consumption of European resources, and a hunter-gatherer lifestyle that integrated traditional practice with elements of the new (Clarke 1994:462). As indicated previously, however, many of these traditional practices had arisen during the period of contact with Macassans.

Culture contact within the historic period had profound implications for the nature and extent of change and variability within coastal north Australian social and economic systems. It is abundantly clear that the introduction of new technologies, particularly the dugout canoe and metal harpoons, meant that both new and existing methods of resource procurement could be refined, and that specific resources could be targeted more efficiently. Social aspects, particularly trade and ceremonial exchange networks, and patterns of mobility and settlement, underwent changes during this time. It is particularly interesting to note that these changes were not restricted to those sites in close proximity to the Macassans, but in fact appear to have been integrated into virtually all aspects of life. With the escalation of European contact and the arrival of the missionaries, settlement and economic patterns altered yet again. This time, however, economic intake was restricted to easily available and seasonally abundant resources. Once again, a strategy was adopted for the incorporation of advantageous food resources and technologies with easily maintained features of the established economic and settlement system. The approximate 200 years of contact prior to the recording of detailed ethnographies in many areas of northern Australia undoubtedly had an immense impact upon Aboriginal life.

The ethnographic present as an analogue for the archaeological past?

Much of the detailed ethnographic data used to interpret the nature of coastal occupation in the past from archaeological remains, comes from studies in central and eastern Arnhem Land. In particular, archaeologists within Australia look to the work of Warner (1969), Thomson (1949) and Meehan (1982). These ethnographies have been used as analogues for the interpretation of archaeological sites from northern Western Australia, the Northern Territory and across to north Queensland.

The first ethnographic observations for the northeast Arnhem Land region began in conjunction with European colonisation at the onset of the Mission period, between 1910 and 1920. This comparatively late period of European contact is reflected in the relative absence of any pre-1920s ethnographic information for the region. For example, the focus of anthropological research in the northeast Arnhem Land region began with Warner (1969:ix), who worked in the Milingimbi area between 1926 and 1929, following the establishment of the Methodist Overseas Mission in 1922. The first anthropologist to work in the Blue Mud Bay area was Donald Thomson (1983:7–8), whose influential work started in 1935. In this area, the Church Missionary Society established

the Roper River Mission (Ngukurr) in 1908, the Groote Eylandt Mission in 1921, and the Methodist mission at Yirrkala in 1935 (H. Morphy 2004:4, 11). In contrast, Meehan's research with the An-barra people in the Blyth River area of north-central Arnhem Land, which has arguably been the most influential study for coastal and north Australian archaeology, occurred during the homeland movement between 1972 and 1973 following the Mission period (Coombs *et al.* 1980; Meehan 1982, 1983, 1988a, 1988b).

These ethnographers working in northeast Arnhem Land, and across northern Australia, have generally characterised the economic structure as being gender and age differentiated, with a yearly round (or wet and dry seasonal dichotomy) based on the seasonal availability of resources (Thomson 1939, 1949:16; McCarthy and McArthur 1960; Warner 1969:4). Referred to by Warner (1969:127–8) as a fission/fusion type of social organisation, movements and group sizes were regulated by the seasonal cycle. During most wet seasons, large areas of eastern Arnhem Land become inaccessible due to flooding, which clearly would have exerted a major influence on seasonal mobility. Ethnographies record that at that time of year, people traditionally had to base themselves at semi-permanent, well-resourced camping places, often on the coastal margins. Additionally, group size tended to be small due to the dispersal, or fissioning, of the population (Thomson 1949:16; Warner 1969:127; H. Morphy 2004:141). While the ethnographic record indicates that the main food supply, except at restricted seasons of the year, was vegetable rather than animal (Thomson 1949:21, 1983:103–5), during the wet season the estuarine reaches, tidal arms and flood plains yielded large quantities of food, mostly fish, with molluscs collected in quantity from the mangrove zone (Thomson 1949:15, 19–20; 1983:103–5). The dry season appears to have provided two distinct possibilities: people could spread out into small family groups to exploit seasonally available, variably distributed resources; alternatively, large groups could come together for ceremonies, or to exploit a particularly abundant resource. As water levels fell in rivers and billabongs during the early dry season, people tended to move inland. Later in the year, when the swamps and wetlands dried out, water chestnuts and cycads provided an abundant staple vegetable resource (Thomson 1949:19–20; Warner 1969:128, 1983:103–5; H. Morphy 2004:142). Freshwater swamps proved to be focal points, as much as they are at present, as these areas are immensely rich in terms of the density of resources during the mid to late dry season, but for much of the rest of the year they have been viewed as inaccessible and inhospitable (Warner 1969:18; H. Morphy 2004:63).

Based on the ethnographic evidence, it appears that the focus of economic activity in Arnhem Land has commonly been on coastal and freshwater wetland/riverine resources (McArthur 1960:113). It has also been argued more generally that pre-contact population densities were much higher in coastal and well-watered areas than in the drier, inland areas (Birdsell 1953; Keen 2003:125). Explanations for greater population densities in coastal areas have been based on the occurrence of permanent or seasonally semi-permanent water sources, and the density of readily exploitable food resources. Although the coastal zone could support a more permanent population base, seasonal environmental characteristics (such as the availability and distribution of resources, and high water levels) were influential limiting factors. The main point here is that people positioned themselves in the landscape to take advantage of the availability and density of a variety of resources on a seasonal basis. These ethnographic observations also indicate that the structure of the foraging economy within a strong seasonal round meant that there was considerable variation in mobility and the size and density of populations throughout the year. The ethnographically recorded Indigenous economies in northern Australia emphasise the fact that people have always had to operate within distinct resource availability restrictions. It also

establishes that on a broad scale, human economic behaviour shows trends towards continuity, but at finer scales there are quite distinct and specific changes relating to external influences, such as the processes of contact, and environmentally induced variation in resource distribution.

The ethnographic record from northeast Arnhem Land also highlights what have been acknowledged as being the basic tenets of human ecology and economy: people will distribute themselves in space and through time relative to the availability of resources (e.g. Foley 1977, 1981a, 1981b; Binford 1980; Isaac 1981; Jochim 1981). This record has provided an overall characterisation of social organisation, but it must be remembered that it only reflects a particular region during a specific period, like a snapshot in time. It has been demonstrated that prior to the initial period of ethnographic observation in the region, extensive changes to settlement, mobility, economy and technology had already occurred as a result of processes of contact. The question remains, therefore, whether these ethnographies are appropriate analogues to assist in the interpretation of the archaeological record. The problem lies not with the nature and value of ethnographies themselves, but in the way in which these observations have been applied by archaeologists to their research. Although several archaeologists have argued that ethnographic analogies derived from contemporary practices should be used to generate models of possible past human behaviour, to be used for comparison against the types of archaeological material present (e.g. David and Lourandos 1997; Bourke 2000; Morrison 2000, 2003, 2010; Barker 2004), in reality they are using the ethnographies to directly interpret the archaeological record. This approach is flawed due to two underlying assumptions. Firstly, it assumes continuity between the behaviour of people in the past with those people observed more recently ethnographically. Secondly, it assumes that relatively little regional change has occurred within the society in question between the time of the ethnographic observations, and the times at which the archaeological record was formed.

A further problem is the use of ethnographic data from distinctly different regions to interpret the archaeological data. Within Australian archaeology, there appears to be a general acceptance that twentieth century ethnographic observations from one area are broadly applicable to other areas that share environmental similarities and have a comparable resource base (Bourke 2000:268). For example, ethnographies from northern Australia have primarily been recorded from groups within the same broad region of northeast Arnhem Land (e.g. Thomson 1949; Warner 1969; Meehan 1982; Davis 1984). The use of ethnographies in this manner is far too simplistic, and potentially limiting. A strict application of this assumption oversimplifies the nature of human-environment interactions, and is likely to conceal or obscure fine-scale variability in the structuring of land-use and settlement patterns in different regions.

Substantial anthropological and linguistic research with the Yolngu people of northeast Arnhem Land within the last century has led to this region being described as a distinct cultural bloc. This interpretation is based on linguistic evidence combined with cultural similarities and high levels of interaction across the region (Keen 1997:271–2, 2003:13; F. Morphy 2004:2–3). Belonging to the Pama-Nyungan language family, Yolngu-matha ('language') is a linguistic enclave, isolated from the rest of its language family by non-Pama-Nyungan languages (F. Morphy 2004:1; H. Morphy 2004:1). For this region, Keen (2003:13) states that:

Northeast Arnhem Land in the Northern Territory comprises a large triangle of land that forms the northwest corner of the Gulf of Carpentaria. It is the home of the people formerly known as 'Murugin' in the anthropological literature, and now known as 'Yolngu', the word for 'person'. The region has a distinctive culture and group of languages markedly different from their neighbouring ones.

In line with the linguistic evidence, it is reasonable to expect, therefore, that there will also be significant cultural differences. A number of anthropologists have described the Yolngu as being culturally distinct from adjacent groups, based on the kinship system, local organisation, ceremonial structures and trade/exchange networks (Warner 1969:15; Keen 1997:271; H. Morphy 2004). This further strengthens the case that the ethnographies may only be applicable on a regionally specific basis. In fact, there are substantial differences in the ethnographies, even within regional northeast Arnhem Land, particularly in the reported emphasis on molluscan resources. For example, Warner (1969:462–3) indicates that molluscs contributed substantially to the diet, and that people on Milingimbi were still discarding shell on the surface of mounds in the 1920s. This is at odds with Meehan's (1982) work with the An-barra in the 1970s, where molluscs were seen to be a seasonal and minor component of the overall diet. This suggests that it is unwise to assume a strong similarity in social and economic aspects of north Australian coastal groups.

The application of the ethnographic record to archaeology therefore involves issues of scale and time depth. Northeast Arnhem Land is a region of cultural and linguistic distinctiveness, and therefore could be expected to differ in many respects from other parts of northern Australia. Furthermore, it is apparent that there are difficulties not only in using ethnographies recorded from this region in other areas of Australia, but also within this one region. This was an area of great variability and adaptability, which has been amply demonstrated for the contact period. Furthermore, changes in these areas may have occurred at intervals beyond the observational period of the ethnographer (Peterson 1971:241; Beaton 1990:28, 33; Moss and Erlandson 1995:29; Hiscock and Faulkner 2006), and even where there are detailed ethnographic indications of population size relative to the subsistence base (e.g. Meehan 1982), our knowledge of the period of time leading into that ethnographic pattern is inadequate. In effect, the scales of observation simply do not match, and therefore sample points of short duration cannot be used to make inferences about long-term processes, their properties or causes (Erlandson 2001:29; Winterhalder et al. 1988:320–2; contra David and Lourandos 1997; Lourandos and David 1998; Morrison 2003:6, 2010). Yet issues of population size, mobility and ceremonial networks have all been examined archaeologically using ethnographic analogy. Given the changes that occurred in these areas with contact, ethnographic observations of population density and mobility serve as poor indicators for calculating pre-contact demography and understanding the structure of ceremonial activity.

The simple, direct application of ethnographic analogies to hunter-gatherers from different temporal and spatial contexts leads to a simplistic and highly polarised perspective of the variability that exists in those processes structuring settlement and subsistence patterns (Pickering 1997:8). Rather than viewing the ethnographies as an example of the processes of interaction within a broader environmental framework, many researchers have applied the ethnographies in a far stricter sense, essentially as the interpretive framework. These ethnographies are seen to provide accurate models of human behaviour, rather than as examples of aspects of human behaviour within a specific regional context. While change is something that many archaeologists recognise in human behaviour throughout the mid-to-late Holocene record of coastal northern Australia, the degree of variability in the archaeological record has almost certainly been underestimated, in particular the degree of inter- and intra-regional variability in human behaviour. Ironically, the ethnographies suggest that northeast Arnhem Land should be an area with diverse economic and social differences. Instead of a direct interpretive framework, the broad patterning of human interactions with their environment should be extracted from the ethnographies, and used to develop questions to be tested by the archaeological record. There are several issues particularly related to aspects of settlement and resource exploitation, as well as implications for possible changes in population size and levels of mobility, that can be tested with archaeological evidence.

Archaeological characterisations of late Holocene change and variability

Given the dynamic response of Aboriginal society and economy to culture contact, it is interesting to consider whether similar levels of change may have occurred in the past in response to changes in the structure of the physical environment and the nature of the resource base. As chronological and spatial variation in environmental and climatic conditions have the potential to affect the structure of the landscape and the resource base, such changes may correlate with a reorganisation in the foraging economy and settlement structures. Archaeological indicators of this process may include variation in the type of species exploited through time, and/or in the intensity of exploitation. Accordingly, the distribution and structure of settlement patterns may vary. Based on the archaeological and ethnographic evidence for the historic period, this may involve the composition and the morphology of sites, particularly the size, shape and rates of formation.

One issue that has been consistently debated relates to characterising the role of shell deposits in coastal economies, such as the nature of midden variability through time and space. There are a number of factors to consider in identifying and characterising the economic structure of coastal areas. Firstly, there is the role of molluscs in prehistoric economies, and how important they were with respect to other coastal and terrestrial resources within a given area. A recent and relatively prominent interpretation has been that the people occupying coastal areas in northern Australia practised a generalised and flexible subsistence economy, utilising resources on the coastal margins, plains and hinterland (Hiscock 1997:447; Bourke 2000:355; Hiscock and Hughes 2001:44). Following from this, opinions on the contribution of molluscs to the diet vary to a greater degree: molluscs are variously seen as a minor component of a broad-based economy (Bailey 1975a, 1975b; Cribb 1986), as a secondary, fallback resource in times of scarcity, as a seasonal staple (Meehan 1982; Erlandson 1988; Barker 1999, 2004), or as the mainstay of the coastal economy (Beaton 1985). For example, Meehan (1977, 1982:58–80, 141–61, 1988a:498–526, 1991) found in her analysis of contemporary diets that although molluscs were one of the lowest yielding food resources, they were both a supplementary and consistent food source.

Secondly, there is the issue of the extent to which shell deposits may be fully representative of past economic activity (Gaughwin and Fullagar 1995:39; Bailey 1999:107–8). While not being the sole focus, many of the issues considered on the north Australian coastline have been dominated by the consideration of large mounded shell deposits. Those areas that have been a particular focus for research into shell mounds (see Figure 1.1) include the coastal Kimberley and Pilbara regions of Western Australia (O'Connor and Veth 1993; Veitch 1996, 1999a, 1999b; O'Connor 1996, 1999; Clune 2002), Darwin Harbour (Burns 1994, 1999; Hiscock 1997, 2005; Bourke 2000, 2002, 2005; Hiscock and Hughes 2001) and Milingimbi (McCarthy and Setzler 1960: 232–3, 244; Roberts 1991, 1994) on the Northern Territory coast, and Bayley Point (Robins *et al.* 1998), Aurukun (Cribb 1986, 1996), Weipa (Wright 1971; Bailey 1975a, 1977, 1994; Bailey *et al.* 1994; Morrison 2000, 2003, 2010) and Princess Charlotte Bay (Beaton 1985, 1986) in north Queensland. This fascination with what Bailey (1999:105) has referred to as the “mound phenomenon” has arisen partly out of their high visibility and clear dominance in many coastal areas across the north.

There are several implications for the timing and nature of mounding behaviour following the discussion presented above, particularly regarding questions of the role of shell mounds in the economy. While shell mounds are prominent within the Blue Mud Bay study area, they must be viewed as evidence for only one component of the overall economic system. This is important, as, at a fine level, there appears to be significant variation across the north of Australia in the structure of the coastal economy, such as the nature of resources being exploited, and in the size

and formation of midden sites. If we are to view these sites as a part of the overall economic structure, then it is imperative that they not be analysed in isolation. O'Connor (1999:48) has stated that shell mounds:

possibly tell us about changes in logistical versus residential mobility, but this is untestable until we have a better understanding of the role they played in relation to other sites. Where are the other archaeological sites contemporaneous with mounds? How do the latter complement the use of mounds? Are mounds merely dinnertime camps, short-term residential sites, or even ceremonial foci where large numbers of people could be supported over short time periods by a productive and predictable resource? It is time to turn our attention from questions of origin to those which address the role of mounds in the wider system.

There are two main points of view in assessing the importance of shell mounds in the broader economic system. Firstly, mounds are viewed as forming one end of a spectrum, one that included smaller sites and surface scatters of shell and artefacts (Cribb 1996:169; Bailey 1999:105). Many of the interpretations of shell mounds provided by researchers have been primarily economic in nature, relying heavily on environmental and ecological data combined with ethnographic information to explain the mounding phenomenon (for example Bailey 1977, 1983, 1994; Roberts 1991, 1994; Bourke 2000, 2005; Brockwell *et al.* 2005). In this case, mounds are generally not seen as being functionally different, and that difference in the morphology of mound sites relative to middens is a reflection of variations in the intensity of discard at a particular location, but not necessarily with higher levels of intensity in occupation and resource exploitation. Alternatively, several researchers have recently proposed that shell mounds played a ritualistic, or ceremonial, role in Aboriginal coastal economies in Darwin Harbour (Bourke 2000, 2005) and in Weipa in north Queensland (Morrison 2000, 2003, 2010). These researchers have acknowledged the environmental and ecological causes for the proliferation of *Anadara granosa*, the dominant molluscan species in these sites, but have interpreted these mound sites based on ethnographic information relating to ceremonial gatherings in the recent past, i.e. have attributed social reasons as the primary causal factor (see also Clune and Harrison 2009; Harrison 2009). This has been done while still acknowledging that in ethnographic accounts, shell discard resulted in low, horizontally spread out middens, rather than the large shell mounds that accumulated before living memory (Bourke 2005:40). This interpretation suggests that there are quite fundamental functional differences between the low-lying shell midden and the mounded deposits, which may have both temporal and social aspects.

In many areas of northern Australia, such as the Blyth River (Meehan 1982:167), Milingimbi (Peterson 1973:187; Roberts 1991) and the Aurukun Shire and Weipa (Cribb 1996:161), shell mounds are regarded as 'dreaming' or 'story' places. In contrast, discussions with Yolngu relating to the shell mounds on the Point Blane Peninsula in Blue Mud Bay shows that there is no contemporary connection to these sites (Hiscock and Faulkner 2006:214–215). In addition, creation stories relating to the areas in which shell mounds are found on the peninsula relate specifically to the environmental structure of the area as it is now; a freshwater wetland system. Various community interpretations attribute these mound sites to 'Noah time' or to previously distinct occupants of the area. In light of the preceding discussion, and in the absence of a direct ethnographic analogue for mounding behaviour, what do the shell mounds distributed around the north Australian coast actually represent? While there are inherent flaws in the ceremonial argument, based on the misuse of the ethnography, and in some ways a misinterpretation of the ecological parameters characterising *Anadara granosa*, (see for example the discussion in Morrison 2003 and Clune and Harrison 2009), these interpretations are widely cited. As such,

these interpretive models will be assessed here relative to the Blue Mud Bay area. In order to do this, it is imperative that mounds not be analysed in isolation, as it is the relative importance of these sites *within* the economy that is crucial for both arguments.

It has been suggested that across northern Australia environmental alteration resulted in changes in resource distribution and abundance, which in turn affected patterns of ecological diversification and settlement, and stimulated social and technological change (Hiscock 1999:96–9). Others have interpreted this type of pattern as a reflection of human interaction with the environment, specifically related to landscape and climatic changes in the Holocene, habitat development, and the availability and distribution of exploitable resources (Jerardino 1997; Wells and Noller 1999; Bourke 2000, 2003; Bailey and Craighead 2003). Variability has been attributed to landscape changes such as erosion, progradation and barrier formation, which have taken place since sea level stabilisation (Head 1983, 1986; Godfrey 1989; Sullivan and O'Connor 1993; O'Connor and Sullivan 1994). In contrast, those working on archaeological material dating to the mid-to-late Holocene who have looked to socio-economic models to explain their material, consider that climatic and environmental oscillations were too insignificant to markedly affect human behaviour (particularly Barker 1999, 2004). As noted by Rowland (1999a:11), however, advocates of purely socio-cultural explanations have tended to underestimate the extent and significance of Holocene environmental change, and to misrepresent the environmental-ecological position. Despite claims to the contrary (see Lourandos and Ross 1994), those environmental-ecological approaches adopted by most Australian coastal researchers have not been deterministic, but have instead acknowledged that people cannot act with no regard to their environment. As Rowland (1999a:12) again states:

Contrary to some views, space is not just a raw material to be shaped by social process, and landscapes are not merely symbolic constructs. People in the past, as they do today, responded directly to environmental changes, but also indirectly to changes in landscape and resource distribution that were initiated by the changes.

Therefore, given the degree of changes to the north Australian coastline, particularly following sea level rise and stabilisation, can these processes be directly correlated with an ongoing process of economic reorganisation? This can be addressed by examining variation in the type of resources exploited, the locations that people were occupying, and the intensity of economic activity.

During the historic period, there appear to have been changes to population sizes and levels of mobility corresponding with economic reorganisation, particularly between the periods of pre- and post-Macassan contact. Given the potential for changes in resource exploitation and shifting patterns of land-use relative to environmental and climatic change, these may also have been features of the more distant past. For example, the intensive harvesting of shellfish has been regarded by some as a key feature of broad-spectrum early Holocene coastal economies (Bailey 1977), and by others as part of a broadly based response to population pressure (Cohen 1977; Yesner 1980, 1987). The proponents of both of these hypotheses hold that mollusc harvesting may have permitted a more sedentary lifestyle for populations inhabiting coastal or riverine areas. That is, with rising population pressure, more intensive forms of gathering, such as of shellfish and grasses, were used as a buffering mechanism against starvation (Cribb 1996:151). These factors are said to be linked to the broadening of the resource base and an increased emphasis on small organisms (e.g. molluscs). In the view of Lourandos (1983, 1985), this hypothesis is causally related to the process of 'intensification' a widespread socio-cultural phenomenon associated with economic change and increasing population size stimulated by social restructuring (Lourandos 1983:81). Following Hayden (1981), Veitch (1999a, 1999b) has argued, for example, that the large *Anadara granosa* dominated mounds of northern Australia are representative of widespread change

in foraging behaviour in the mid-to-late Holocene, characterised by an increased focus on small-bodied organisms. His preferred explanation is socially oriented, linked to increases in population size and the degree of sedentism (see also work by Cohen 1977:76–83; Lourandos 1980, 1983; Stiner *et al.* 1999, 2000; Stiner and Munro 2002). Such an economic shift presumably allowed larger populations to live along the mangrove-lined coasts of the humid and arid zones. This theory suggests that the shell mounds are a reflection of broader behavioural developments, as opposed to a response to environmental changes on the coast (Veitch 1999b:60). Other archaeological studies in these coastal areas of northern Australia have implied that major environmental changes, rather than strictly social changes, preceded growth in human populations, and that the growing productivity of newly created landscapes combined with higher population levels, were causal factors in cultural change, variations in mobility, or increasing land and sea use during the Holocene (Beaton 1985; Jones 1985:291–3; Meehan *et al.* 1985:153; Sullivan 1996:7). In explaining the variability of coastal occupation in the north over the Holocene, a number of researchers have focussed on environmental explanations such as changes in local ecological habitats (Hiscock and Mowat 1993; Mowat 1995; Hiscock 1999; O'Connor 1999), as well as pointing to the links between the appearance of mounds and evidence for increasing aridity and the northward movement of the northern monsoon on the coast (O'Connor and Sullivan 1994; O'Connor 1999). This particular type of ecological perspective does not view human culture as being determined by the environment, nor does it assume perfect adaptation of humans to their environment. Rather, it suggests that the archaeological manifestation of a defined set of human behaviours, such as the structure of economic activity, may be viewed best in terms of the structure of a particular environment (Cribb 1996:150). It follows that the structure and organisation of the economy are often linked to changes in the size of populations and the level of mobility. As such, developing an overall regional chronology in conjunction with assessing the distribution and density of archaeological material, particularly relative to environmental variability over the course of occupation, may go some way toward addressing this question.

Although many archaeologists have emphasised change and variability in the late Holocene, due to the fact that they are placing the archaeological record within a contemporary framework, by adhering strictly to the social and economic patterns described ethnographically for the historic period, there is only so much variability that can be interpreted in terms of these changes. Consequently, such interpretations are to a certain degree linear and unidirectional models of behaviour. Furthermore, when these patterns are projected into the past, particularly given known Holocene environmental and climatic changes, the result is an underestimation of the degree of change and variability within the archaeological record. In assessing the social and economic structures of the past, this methodology creates a circular argument. By interpreting the archaeological record with modern behavioural data, researchers are only able to recognise minor variation within larger scale continuity. Yet while they generally interpret the nature of Aboriginal society and economy as having been dynamic, practising a generalised and flexible subsistence economy, non-linear change or development has not generally been considered. This suggests that further economic and social variability in the late Holocene may yet be demonstrated.

Monograph structure

As the archaeological record within the study area spans the period from the mid-to-late Holocene, to the relatively recent past, the present-day climatic and environmental conditions, and contemporary resource availability are presented in detail in the following chapter. In order to determine the framework that people were operating within at a given period, environmental data from 10,000 BP to present has been compiled broadly from northern Australia and the Indo-Pacific region, covering aspects of sea level change, sedimentation, progradation, climatic

changes, salinity, floral and faunal changes. This overview supports the hypothesis that conditions were gradually changing through time, with dramatic effects on the resources available at various periods. As noted above, this has implications for the structure of resource distribution and availability and for the way humans may have interacted with their environment throughout the Holocene.

A discussion of the survey and site recording methodology employed, followed by an analysis of the survey results relating to patterns of settlement, site distribution and resource exploitation follows in Chapter 3. This includes a description of all aspects of the archaeological record documented on the Point Blane Peninsula, such as shell middens, shell mounds and stone artefact scatters. The chronological and spatial patterns identified through the survey of the study area characterise the archaeological evidence for occupation and resource use at a broad level. An interpretation of the survey findings is made, correlating the archaeological pattern with environmental factors, in order to frame the discussion of the sample of sites selected for excavation. The patterns found within this analysis are explored further and at a finer level of detail through analysis of a number of midden and mound sites in Chapters 4 and 5. These results highlight patterns of variability in the economic structure. Six sites were selected for excavation, and Chapter 4 discusses the three mounded deposits excavated on the margins of Grindall Bay, and the three sites excavated at various locations along the open coastal margins of Myaoola Bay. The level of variability in the molluscan assemblages within the six sites is assessed in Chapter 5, relative to previously discussed patterns of environmental change. An investigation of differences in the intensity of occupation and resource use across the peninsula is presented in Chapter 6, drawing in part on the findings from the three previous analytical chapters. In this way, variability and change in the economic structure through space and time is evaluated. Based on these data, a model of occupation, landscape use and the human behavioural-environment interaction is presented and discussed. Chapter 7 considers the relevance of these conclusions for the research questions outlined above, with implications for the broader north Australian context.

In light of the frequently changing nature of the northern Australian coastline, it is necessary to first gain an understanding of how these changes have affected the landscape and economic potential of the region. It is therefore likely that by identifying spatial trends in the distribution of archaeological material, the composition of the middens, and the date at which clusters of middens occur along the coastline, that the nature of the impact of environmental changes on the occurrence of the middens can be explored.