In this chapter I suggest archaeological sites also move on the tides, with the argument that canoes are mobile sites. I explore the implications this has for modeling seascape settlement systems and maritime migrations associated with specialized marine-oriented island societies, such as Torres Strait Islanders in an Indigenous Australian “salt-water people” context (see Sharp 2002) and Lapita colonists in the western Pacific. A preliminary review of how islands are conventionally conceptualized by archaeologists—as variously marginal terrestrial habitats—highlights a paradox in island settlement modeling, where a focus on terrestrial dynamics limits our potential understanding of the holistic nature of social seascape construction (see McNiven, this volume) and island settlement that is a part of it. Expanding our spatial context beyond terrestrial habitation, and reorienting our approach to pay more attention to the vital role of nonresidential islands, coral reefs, and canoes, provides a more appropriate and insightful context to interpret the complexities of seascape settlement systems and better comprehend the relationship between available site patterning on islands and the missing sites between them.

**Background: Landscapes, Islands, Seascapes**

Islands are ambiguous terrestrial landscapes; they are someplace between continents and the sea. On the one hand, there are continents that are also islands (that is, Australia) and subcontinental islands (for example, New Guinea). On the other hand—and more the focus of this chapter—there are islands, such as coral atolls, that cannot support fully terrestrial economies. These are alien terrestrial landscapes that can be more sensibly conceived as being part of the seascape. Islands can be defined simply as “a piece of land surrounded by water” (Rowland 2002: 62), yet ultimately every piece of land is surrounded by water, and, as Nunn (1987: 228) suggests, the “definition of ‘small’ when applied to an island is as subjective as the definition of what is an island and what is not.” Islands can be classified according to various natural processes associated with geography and geology, but there are also such things as “artificial islands” (Ivens 1927: 23).

One point of clarity, however, is that referenced to terrestrial continental landscapes, islands are...
inevitably perceived as marginal: spatially (remote, inaccessible); temporally ("among the last parts of the globe to be settled") Broodbank 2000: 7); socially (insular, isolates); ecologically and economically (tenuous, depleted). Small islands, especially, are perceived as some of the most illogical, risky, and precarious places to live on the planet, and there is a general expectation that relatively small, low, remote islands will be settled after larger, nearer, higher, less risky islands more suited to cultivation and permanent habitation. However, radiocarbon date distributions do not always support this logic (Keegan and Diamond 1987: 52). For example:

- The lower atolls and raised limestone islands of Eastern Micronesia appear to have been settled around the same time as the higher rockier islands of Western Micronesia (Rainbird 2004: 86–97);
- Polynesia’s “mystery islands” likewise appear to have been systematically settled around the same time as larger, less remote islands in the region (Irwin 1992: 177);
- In a Torres Strait context, Barham’s (2000) tentative model for settlement of the lower islands closer to Australia and Papua New Guinea prior to the settlement of more remote islands is also now in doubt: small remote islets currently provide the earliest evidence for specialized maritime settlement in the region (see Crouch et al. 2007; McNiven et al. 2006a).

Conventional island settlement models, however, largely focus on patterning associated with the process of islands becoming permanent habitats (e.g., Graves and Addison [1995]: discovery → colonization → establishment; or Anderson [1995]: visitation → colonization → habitation). These can be understood as “habitation space approaches” (see Kirch 1984: 96–122) that tend to exclude rather than integrate the role of nonresidential islands. However, identifying permanently inhabited sites (Kintigh 1994) or islands (Terrell 1986: 14) is far from straightforward, and islands are not always socially designed specifically as a locus for permanent habitation. These sorts of islands are variously described throughout the archaeological literature in terms of their role in subsistence settlement systems, as “economic satellites” (Irwin 1992); “utilized” vs. “occupied” (Cherry 1990); and “seasonal” vs. “residential” (Jones 1977). Their identification lies in not being the locus and focus of permanent settlement—they are spatially and economically marginal. Yet McNiven (2000) has shown social retreats. And as Weisler (2001: 3) explains: “Despite the marginal position Utrök Atoll occupies as a terrestrial landscape, the marine environment is clearly at the opposite extreme”. Furthermore, land shouldn’t be assumed the “locus of settlement”—or “home”—for highly mobile sea-oriented communities (Gosden and Pavlides 1994: 162) or the most suitable frame of reference for modeling centrality and marginality in island networks (cf. Hage and Harary 1996). Broodbank (2000: 238) rejects focusing on “unitary islands” and instead suggests modeling centrality in terms of “patch-works of land and sea.” And along with land and sea we need to acknowledge the role of coral, because although island landscapes are generally regarded as potential habitats and coral reefs are not, reef settlement is a reality. Stilt villages situated on island fringing reefs are key Lapita settlement sites (see Gosden and Webb 1994; Gosden and Pavlides 1994; Kirch 2000: 107; Rainbird 2004: 92–95). For example, during the Lapita period the Arawe Island group in the Bismarck Archipelago (Papua New Guinea) provides “evidence of a clustered settlement pattern in the form of stilt villages built in shallow water on the lee sides of islands” (Gosden and Webb 1994: 29). Here the stilt villages actually caused and nucleated beach formation—the seabed itself is a cultural deposit (see also Felgate [2001] regarding intertidal settlement sites across Near Oceania). In addition to the leeward patterning of Lapita stilt village settlements, they are also commonly located proximal to reef passes facilitating canoe access to the sea (Kirch 2000: 107). Thus intra-island settlement patterning (leeward-windward, inside-outside) is highly influenced by the shape of the seascape—the interrelationship between land, sea, coral, winds, tides, channels, and so on. Ultimately, marginality can be seen as a “socially perceived construct” (Lourandos 1997: 23), and in a socially constructed seascape, the most marginal place you can be is in the middle of a large island.

As seascapes, islands are no less ambiguous, only here they are just the tip of the iceberg. A growing understanding of systems of Indigenous customary marine tenure (a key book is Cordell’s [1989] A Sea of Small Boats) warn archaeologists that “the water is not empty” (Jackson 1995). So, whereas Kirch (2000: 304) suggests that “while the human settlement of Oceania is often thought of in maritime terms, as constituting a succession of great voyaging feats, these voyages were primarily means to an end: the discovery of new landscapes that could be claimed, named, divided, planted, and inherited,” we must recognize that for many Indigenous maritime societies, the seascape is
(see McNiven’s definition of “seascapes,” this volume; see also Magowan 2001; Nietschmann 1989; Sharp 2002). So, there is a paradox: why do we model terrestrial habitation and migration triggers for specialized maritime island societies? If the goal of modeling island settlement patterning is to identify “rules” or structures of the settlement system (Flannery 1976), then we need to look beyond terrestrial “rules” and patterning for maritime migrations and examine the holistic settlement of patches of sea. We need to better integrate the quintessential role of coral reefs and non-residential islands into the settlement system, and pay more attention to the coordinated use of entire island clusters and patches of sea. For example, Di Piazza and Pearthree (2004) adopt a palaeo-economic approach (following Anderson 1997) to modeling settlement of the Phoenix Islands where “the domestication of the sea” by these ancient navigators fostered the domestication of the entire Phoenix archipelago and even beyond” (Di Piazza and Pearthree 2004: 105, my emphasis). I posit that a platform to reorient our approach is in conceptualizing canoes themselves as mobile and manifold archaeological sites: they are the glue that binds the seascape settlement system together, and although all but invisible to archaeological survey, they are a key to contextualizing the available patterning of nonmobile sites they complement.

**Centrality in Patches of Sea**

Tenacious debate in island archaeology was sparked by the notion of “islands as laboratories” (developed initially for island biogeography by MacArthur and Wilson 1967) over whether insularity is a key concept for understanding cultural processes on islands (e.g., Broodbank 2000; Evans 1973; Gosden and Pavlides 1994; Rainbird 1999; Terrell 1986; Terrell et al. 1997; Walker 1972). This debate is largely beyond the scope of this chapter, but within it a key series of interrelated dichotomies have crystallized: bridge/barrier; connected/insular; seascape/landscape. Ultimately, there is general agreement that the concept of relative insularity (see Terrell, this volume) and principles of island biogeography can generate significant insights into settlement phases for island societies, but primarily in terms of colonization as dispersal (one-way mobility, cf. migration as two-way mobility, Anderson 2003) and thus via phylogenetic models (e.g., Kirch 1984). However, the focus here is on maritime migrations by highly mobile island societies and how they build bridges, connections and social seascapes. Binford (2001: antithesis of my view: “Although human actors are capable of direct participation, ecologically speaking, in a terrestrial setting, they may be thought of as outsiders in aquatic biomes; they intrude at times, but always at very restricted locations and under rather specific conditions.” Torres Strait Islanders are “one of the most marine-oriented and sea-life dependant indigenous societies on the planet” (Cordell 1993: 159), documented as exploiting over 450 species of marine organisms (McNiven and Hitchcock 2004). They are not “outsiders” or “intruders” in their seas, ecologically, or in any sense. Instead we can ask: what conditions specialized maritime “intrusions” into terrestrial island biomes?

Tudu (Figure 11.1a) is a small, low sandy cay measuring 1.6 by 0.75 kilometers, and with a maximum elevation above sea level of 4.6 meters (Fuary 1991: 443–44). Tudu is “merely a sandbank” (Haddon 1935: 27), yet it was calculated by Hage and Harary (1996: 165–203) as the most “central” island in the Torres Strait network. Here “centrality” has three definitions: number of trade routes connected; nearness to every other island in the network; and degree of “betweenness.” The argument is presented alongside another theory, where the relative potential of islands to act as agricultural versus foraging locations is seen as the architect for resulting trade relations (for example, trade/exchange of marine resources for plant resources), following Harris’s (1979) trade-horticulture hypothesis. However, the ca.1892 resettling of people from Tudu (the Tudulgal) to Iama (or Yam)—owing to water shortages (Shnukal 2004: 330) and sociopolitical factors associated with the colonial regime (McNiven, Crouch, and David 2004)—creates a situation wherein the most central and strategic island in the Strait was abandoned as a residential base. Now although from an island-centric perspective this is puzzling, if the highly proximal location of Tudu to Warrior Reefs (the largest coral reef system in the Strait, adjacent to the Great North East Channel voyaging route) is taken into account, the residential emigration to Iama is not a case of abandoning the most central settlement node in the seascape network, because in reality (Figure 11.1b) Warrior Reefs surely deserves that title. There is the theory that the Kulkulgal (the Central Islanders of Torres Strait, including the Tudulgal) operated as specialist traders or “middlemen” (Hage and Harary 1996; Harris 1979; Vanderwal 1973) in the elaborate regional customary exchange network documented ethnographically (see Lawrence 1994). While I do not dispute this view, this is
The settlement of Tudu needs to be understood and contextualized as part of the settlement of Warrior Reefs within the social construction of the Kulkulgal seascape.

So the small size of Tudu, and associated demographic situation, was not what triggered the ca.1892 emigration, and evidently size did not deter initial colonization (migration). Perhaps island shape is more pertinent than size here: an elongated flat sandbank provides ideal canoe anchorage, which is a vital commodity for maritime migrations and not something you can import (cf. freshwater, imported by canoe to Tudu from Iama, in long thick lengths of bamboo, Shnukal 2004: 320). With specialized maritime island migrations, large canoes are already operating as mobile and manifold sites in the seascape. So a prime question is this: how do mobile canoe sites structure the subsequent patterning of terrestrial nonmobile sites?

Canoes as Mobile Sites

Canoes are usually discussed in terms of maritime technology. For Torres Strait, canoes have been identified as the single most significant item of material culture, allowing vital trade/exchange systems to operate, and ultimately making island settlement viable (Barham 2000). In the context of Pacific island colonization, their virtual archaeological invisibility yet fundamental role has led to "contentious conjecture" over seafaring hypotheses (Anderson 2003: 78–81) and decades of experimental voyaging (e.g., Finney 1977, 1996; Irwin 1992) and computer simulations (pioneered by Levison, Ward, and Webb 1973, but see also Irwin 1992). If Irwin’s (1992) model for continuous and systematic exploration and colonization of the Pacific islands through “return voyaging” is accepted (but see Anderson et al. (2006) regarding “ENSO Forcing” and cf. Sharp’s model for return voyaging).
[1956] argument for “accidental colonization”), a key point is that colonists were spending vast amounts of time in canoes within “a frontier of exploration.” So, there is much more to canoes than just getting from A to B, and the focus here, following Ames (2002), is how their capacity—combined with their mobility (and motility)—has profound implications for structuring island settlement patterning.

An extreme example of canoe capacity is the long-distance trading expeditions—the hiri—of Motu groups in southern Papua New Guinea, where it is estimated between 26,000 and 32,500 pots loaded on 20 lagatoi canoes with 600 men would leave Western Motu villages in single expeditions, returning around five months later with 600 tons of sago carbohydrate (Allen 1984: 426–27). Furthermore, Ames (2002) shows that canoe capacity concerns large and varied task groups that can include dogs, children, men, and women. We need to be thinking about canoes as manifold sites: moving hearths and water reservoirs; sites of learning and “enskilment at sea” (Palsson 1994); hunting sites and fishing sites; sites of residence and trade/exchange. And in a seascape context of “amity and enmity” such as Torres Strait (McNiven 1998), where trade/exchange alliances are entangled with headhunting prospects, it seems logical to expect canoes were often loaded with a variety of cargos and prepared for various kinds of negotiations—including open water ritual negotiation of the seascape itself as a spiritscape (see McNiven 2003, this volume).

In Binford’s (1982) renowned paper “The Archaeology of Place,” a key conceptual outcome for settlement models is the argument that although places are fixed in the landscape, sites (for example, field camps) move. Importantly, archaeology

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**Figure 11.1** Torres Strait. (A) islands; (B) coral reefs.
can model this—through the nature and the degree of superimposition of site-specific material assemblages across fixed places. But for seascape settlement systems, we have a situation in which both sites and places move. Although a full discussion of how canoes are moving places is largely beyond the present scope, I would suggest—in an archaeological context at least—that canoes are mobile places in a similar sense to the way Casey (2001) discusses the body as a dimension of place: the outgoing body "goes out to meet the place-world," and the "place-world is energized and transformed by the bodies that inhabit it, while these bodies are in turn guided and influenced by this world's inherent structures" while the incoming body "is shaped by the places it has come to know and that have come to it—come to take up residence in it, by a special kind of placial incorporation" (Casey 2001: 413–14). Thus archaeology has access to canoes as outgoing bodies—we can investigate how canoes have "energized and transformed" the place-world—but only through disciplines such as ethnography and anthropology can we see them as incoming bodies. Notions of embodiment and perception also encourage comparisons between driving and voyaging: Dant’s (2004) notion of the "driver-car" assemblage "as a form of social being that produces a range of social actions that are associated with the car; driving, transporting, parking, consuming, polluting, killing, communicating, and so on" (Dant 2004: 61–62), highlights how people and canoes together (that is, "crew-canoes") structure—and are structured by—the material world in a very different way to pedestrian bodies; to the "world perceived through the feet" (Ingold 2004).

Discussion

So if canoes are mobile sites and places, the question is (how) can archaeology model this (cf. "the archaeology of place")? I suggest that it is possible if we examine amphibious processes, where the best resolution must come from non-residential islands, owing to a more direct (less conflated) relationship between mobile and non-mobile sites. First, it is necessary to differentiate between types of mobility (for example, "residential," "logistical," and "tactical," [see Kelly 1992]) and mobility itself—that is, "moveableness" [Close 2000]). Close (2000) is concerned with fine-grained modeling of actual patterns of movement in the past and how this can be achieved through refitting artifacts. When we identify imported material culture on islands, and their source locations, we are also inherently refitting. However, movement involves intermediate mobile canoe sites. In a Torres Strait context, McNiven (1998) has shown that stone-headed clubs (gabagaba) were actually moving back and forth across the Strait; sometimes in canoes operating as mobile trade/exchange sites but also in canoes operating as mobile raiding (headhunting) sites.

Canoes are certainly "moveable," and their mobile capacity makes them also a key factor in terms of conceptual types of mobility for archaeology. Kelly (1992: 60) suggests that a continuum between sedentary and mobile is inadequate, because mobility is "not merely variable but multidimensional" and that the focus should be on disentangling various dimensions of mobility, and modeling how they interrelate. Ames (2002) likewise questions the relevance of the forager-collector continuum for modeling subsistence settlement patterns associated with "aquatic hunter-gatherers," where canoe (boat) capacity can generate widespread multitask (resembling residential) signatures throughout "foraging" areas—where "it becomes hard to distinguish a logistical foray from a residential shift involving an entire settlement" (Ames 2002: 43). However, there is more to settlement than simply subsistence, and, moreover, aspects of ritual and subsistence practices can be deeply entangled in social seascapes and island archaeological records (in a Torres Strait context, see Barham, Rowland, and Hitchcock 2004; McNiven 2006; McNiven and Feldman 2003).

Binford’s (1980) forager-collector continuum polarizes residential mobility (that is, "foragers" who are "mapping on" to resources) against logistical mobility (that is, collectors who employ complex logistics), argued to be a product of environmental adaptation. Thus, the ends of his continuum are exemplified by San (“foragers” in an arid setting) and Nunamuit (“collectors” in an arctic setting). The model suggests collectors will generate a greater range of archaeologically discernable (homogeneous) site types outside the "residential base" (heterogeneous) site range. Thus "foragers" produce only "residential bases" and "locations," while collectors produce at least three additional site types: "stations," "caches," and "field camps." But canoes facilitate simultaneous “mapping on” and “complex logistics”—they are akin to Nunamuit sleds in terms of logistic potential and can facilitate various types of residential migrations (colonizations, seasonal shifts, evacuations, and so on). Mobile canoe sites potentially encompass all of Binford’s site types, and many more.

Besides Binford’s framework of environmental adaptation, and his secular focus (Insoll 2004:
are some other problematic aspects to this model for both landscape and seascape settings. In an Aboriginal Australian context, Lourandos (1997: 20) suggests the continuum is far from environmentally determined; it can clinally shift at any time in any environment, owing to sociodemographic circumstances and strategies. In terms of Lapita colonization in the western Pacific, where there is an established inventory of over 180 Lapita sites (for example, containing dentate-stamped pottery [see Anderson et al. 2001]), “the density of sites on the coasts of large islands is lower than on small islands throughout the Lapita range” (Anderson 2001: 16), leading Anderson (2001)—in conjunction with chronological patterning—to question whether there might in fact be binary phasing in migration mobility: “released and space-transgressive”—evident in Remote Oceania (cf. Groube’s (1971) “strandlooping” model) versus “tethered and time-transgressive”—evident in Near Oceania (cf. population growth model).

Synthesizing Anderson’s idea of binary migration mobility with the concept of canoes as mobile sites, and with attention to trends associated with shifting sociodemographic circumstances (for example, increased degrees of social closure, territoriality, boundary maintenance, and alliance formation [Lourandos 1993, 1997]), we can begin to formulate an amphibious seascape settlement model. When specialized maritime societies migrate to new patches of sea, constructing and propagating their social seascape frontier, mobile canoe sites (and their nonmobile terrestrial counterparts) will have a spatially extensive distribution. At this stage, canoes operating as mobile sites provide a risk-minimization strategy; even if remote islands are found to be highly marginal terrestrial habitats, this is offset by the already established canoe sites: advanced mobile canoe sites are the secret to remote island colonization. As the patch of sea develops into a “sea territory” (see Nietschmann 1989), migration mobility shifts to a more time-transgressive phase, where the distribution of mobile canoe sites becomes funneled and “tethered” into a more formalized system of “canoe traffic” (Lawrence 1990) associated with the development of more complex systems of regional alliance, as well as increased ritual and territorial marking (for example, rock art sites, ritual and ceremonial sites). Last, there is the prospect of more intensive use of ecological niches previously considered as more marginal environments (Lourandos 1997: 23), which in the case of specialized maritime island societies may relate to

Conclusions

I have attempted to demonstrate that mobile canoe sites occupy an integral, fundamental, and central place in seascape settlement systems. They are not outside the settlement system, and for specialized maritime peoples such as Micronesian navigators—for whom the sea is a moving frame of reference (see Gladwin 1970; Turnbull 1991)—canoe sites are in fact perceived as “the centre of the world” (Ingold 2000: 240), moving in temporal and locational harmony with the sea. Islands, in contrast, are perpetually morphing their shapes and sizes, oscillating and reforming in tempo with the tides, moons, seasons, and so on. Amphibious settlement of such a dynamic world, launched from a platform of canoe sites, makes the intertidal zone a highly complex boundary—spatially, temporally, socially, and physically—and a crucial locus for ongoing archaeological attention. Nonresidential islands, with their more direct relationship with canoes, crews, and cargos, offer exciting prospects and special insights into the complex nonresidential world of voyaging, customary marine tenure, management, and trade/exchange.

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Note

1. I use the words “foraging” and “forager” to facilitate engagement with literature about mobility, where those terms are established and widespread. However, as Ingold (2000: 58) suggests, “foraging” derives “from the field of ecology, to denote the feeding behaviour of animals” and is a problematic and potentially highly offensive abbreviation for understanding how people feed themselves.

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