CHAPTER 16

OUT OF THE BLUE AND INTO THE BLACK: The Middle-Late Maritime Woodland Transition In the Quoddy Region, New Brunswick, Canada

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It has been thought that these kitchen-middens around the shores of Passamaquoddy Bay were made by a people who camped along that shore in the summer for fishing and hunting, but retreated inland to the shelter of the woods in winter. There are, however, indications that the occupation of the village sites marked by these shell heaps was more or less continuous.
(Matthew 1884:25)

INTRODUCTION

The Quoddy Region (Figure 16.1) is a biogeographically defined marine and coastal region, situated at the confluence of the Gulf of Maine and Bay of Fundy systems, that acts as the estuary of the St. Croix and Magaguadavic Rivers. The region includes portions of northern Maine and southern New Brunswick, and consists of a complex, dynamic mosaic of fog-zone forests, freshwater marshes, salt marshes, mixed substrate intertidal zones, coves, channels, and continental shelf that exhibits great biological productivity (Black 1992; Sanger 1988:84; Thomas 1983). As shown by the quote above, archaeologists have speculated about prehistoric Native subsistence practices and settlement patterns in the Quoddy Region since the pioneering work of nineteenth-century natural historians.

In this chapter, I summarize what is known of Maritime Woodland (1250 B.C.-A.D. 1400) subsistence and settlement in the Canadian part of the Quoddy Region in the context of a brief review of archaeological research in the region. I focus specifically on the Middle-Late Maritime Woodland transition (ca. A.D. 650-750) and the Late Maritime Woodland period (A.D. 650-1400). In so doing, I demonstrate that a detailed understanding of the physical structure of the archaeological record is a crucial prerequisite to further understanding subsistence and settlement change during the Maritime Woodland period.

The Quoddy Region is part of the traditional territory of the Pestomuhkatiyik—the Passamaquoddy people (Erickson 1978). There is no archaeological evidence that either the ancestors of the Pestomuhkatiyik or their immediate neighbours practiced horticulture prior to European contact (cf. Deal, this volume; Petersen and Cowie, this volume; Sanger 1988:95). Thus, in interpreting prehistoric subsistence and settlement in the Quoddy Region, archaeologists are reconstructing the settlement patterns and seasonal rounds of foragers adapted to the littoral zone and to adjacent terrestrial and marine habitats.

The interpretations of Quoddy Region prehistoric settlement and subsistence I present here are based on 16 components dating A.D. 650–1400. Nine of these components are located on the northern shores of Passamaquoddy Bay (the Canadian mainland of the Quoddy Region), examined by David Sanger and his students and colleagues from the 1960s through the 1980s; seven are located in the insular Quoddy Region, examined by myself and my students and colleagues, from the 1980s through the present. Site locations are shown on Figures 16.1 and 16.2. Brief summaries of relevant data for each component are presented in the Appendix.

Northeast Subsistence-Settlement Change: A.D. 700–1300 by John P. Hart and Christina B. Rieth. New York State Museum

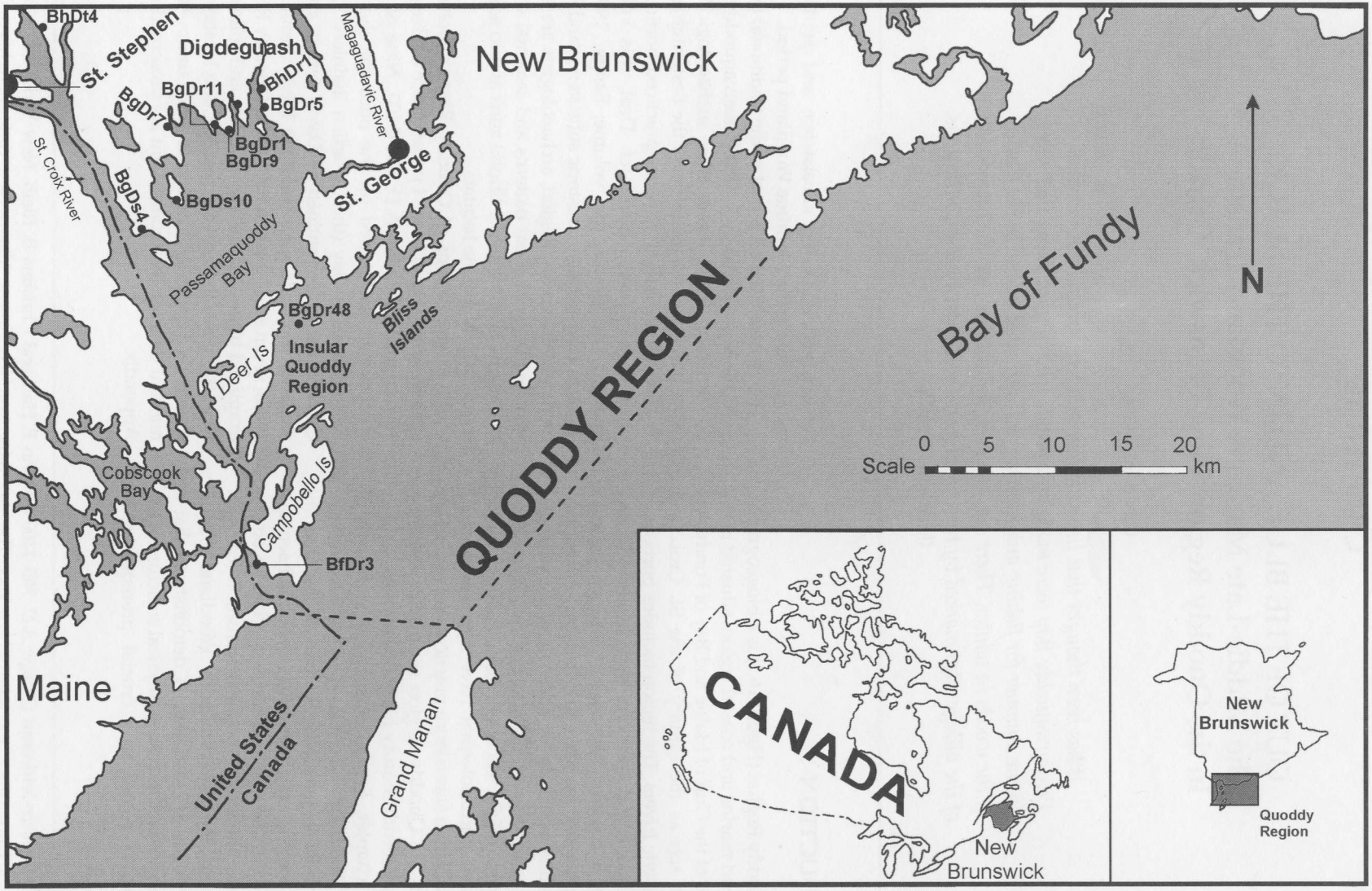

Figure 16.1. Map of the Quoddy Region, showing the locations of archaeological sites and places referred to in the text.

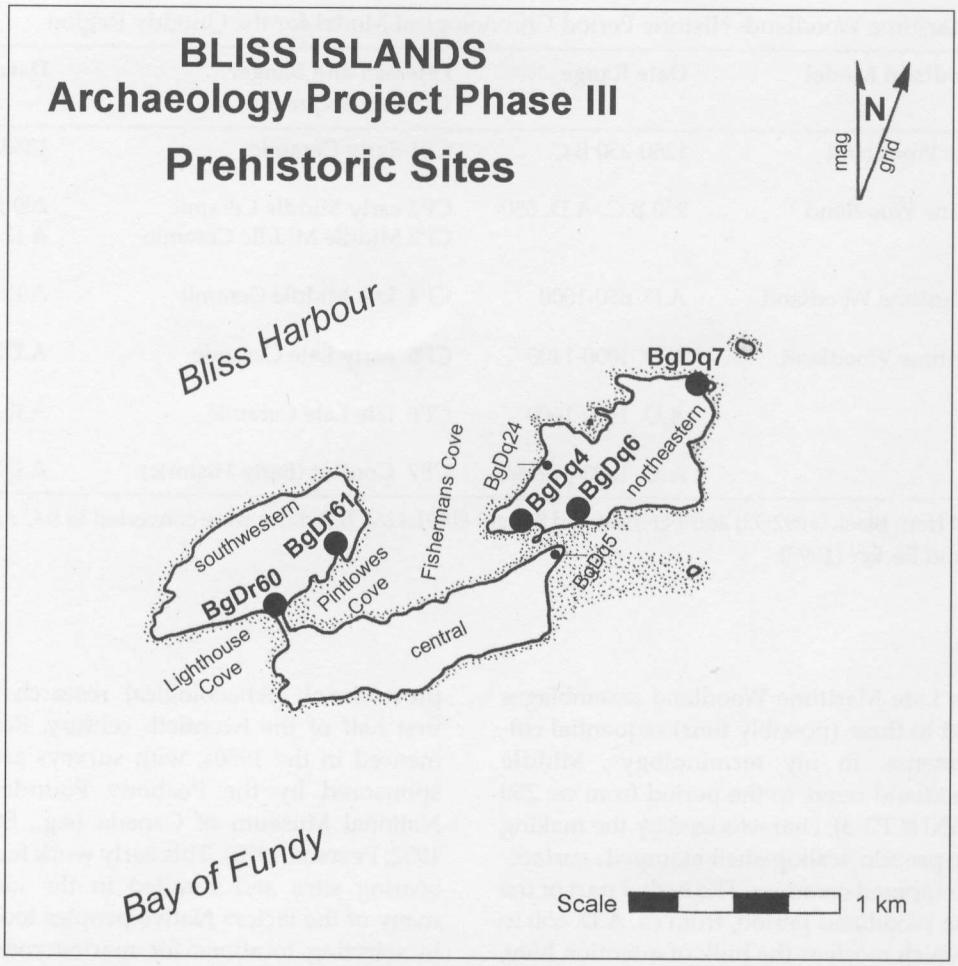

Figure 16.2. Map of the Bliss Islands, showing the locations of prehistoric archaeological sites. Sites designated by Borden numbers in large type contain Late Maritime Woodland components.

CULTURE-HISTORICAL CONSIDERATIONS

Table 16.1 shows the system of Maritime Woodland-Historic period culture-historical nomenclature I use[1]. Although stylistic changes in artifact types have long been recognized (e.g., Matthew 1884; Pearson 1970; Sanger 1986; Tuck 1984), there has been a long-standing tendency for archaeologists to treat the Maritime Woodland as a single unit of analysis—and to treat sites and components dating to this period as single units of analysis—especially with respect to subsistence, seasonality, and settlement studies (cf. Turnbull and Allen 1988:256). That this tendency persists is exemplified by Sanger's (1987:136) definition of the Quoddy Tradition as a single, undifferentiated adaptation spanning the years from ca. 250 B.C. to ca. A.D. 1600, by Tuck's (1984:42-85) separation of the Maritime Woodland sites in the Maritime Provinces by ethnocultural areas but not by temporal units, and by Bourque's (1995:169-222) treatment of all Maritime Woodland remains at the Turner Farm site on the central Maine coast as a single component ("occupation" in Bourque's terminology).

In contrast, I have adopted a stratigraphic and chronological approach to Maritime Woodland subsistence-settlement systems (Black 1988, 1992, 1993). The precision of this approach has been enhanced recently by Petersen and Sanger's (1991) ceramic chronological sequence for the Maine/Maritimes area (Table 16.1),

Table 16.1. Maritime Woodland–Historic Period Chronological Model for the Quoddy Region.

Maritime Woodland Model	Date Range	Petersen and Sanger Ceramic Sequence	Date Range
Early Maritime Woodland	1250-250 B.C.	CP1 Early Ceramic	1350-200 B.C.
Middle Maritime Woodland	250 B.C.-A.D. 650	CP2 early Middle Ceramic CP3 Middle Middle Ceramic	200 B.C.-A.D. 400 A.D. 400-650
earlier Late Maritime Woodland	A.D. 650-1000	CP4 late Middle Ceramic	A.D. 650-1000
later Late Maritime Woodland	A.D. 1000-1400	CP5 early Late Ceramic	A.D. 1000-1300
Protohistoric	A.D. 1400-1600	CP6 late Late Ceramic	A.D. 1300-1450
Historic	A.D. 1600-present	CP7 Contact (Early Historic)	A.D. 1450-1650

Note: Adapted from Black (1992:92) and Petersen and Sanger (1991:126). B.P. dates were converted to B.C./A.D. using data from Stuiver and Becker (1993).

which allows Late Maritime Woodland assemblages to be assigned to three (possibly four) sequential cultural components. In my terminology[2], Middle Maritime Woodland refers to the period from ca. 250 B.C. to A.D. 650 (CP2-3), characterized by the making of dentate or pseudo scallop-shell stamped, surface-treated, grit-tempered ceramics. The earlier part of the Late Maritime Woodland period, from ca. A.D. 650 to 1000 (CP4), which receives the bulk of attention here, is characterized by the making of grit-tempered ceramics decorated on the upper bodies and rims with dentate stamping or cord-wrapped stick impressions and large round punctations. This period may be separated into two parts, the earlier part (CP4a) characterized by rocker-dentate stamping and the later part (CP4b) by cord-wrapped stick impressions and occasional use of shell temper (Petersen and Sanger 1991:140). The later part of the Late Maritime Woodland, from ca. A.D. 1000 to 1400 (CP5-6), is characterized by the making of shell-tempered ceramics decorated on the upper bodies and rims with cord-wrapped stick impressions.

SETTLEMENT AND SUBSISTENCE RESEARCH

Archaeological research began in the Quoddy Region in the late nineteenth century with the work of natural historians, especially Baird (1881) and Matthew (1884). Subsequently, there was a hiatus in professional archaeological research spanning the first half of the twentieth century. Research recommenced in the 1950s, with surveys and excavations sponsored by the Peabody Foundation and the National Museum of Canada (e.g., Stoddard et al. 1952; Pearson 1970). This early work focused on shell-bearing sites and resulted in the identification of many of the factors Native peoples took into account in selecting locations for marine coastal habitation sites. These include: (1) locating sites on low-gradient, well-drained areas close to the high-water line, often at the heads of small coves; (2) site exposure to the south (direction of exposure to sun and summer prevailing winds), and shelter to the northwest (direction of winter prevailing winds); (3) proximity to small freshwater marshes, springs, or streams (presumably used as sources of potable water); (4) proximity to high-productivity intertidal zones, such as clam flats and intertidal ledges; and (5) proximity to places where small boats[3] could be landed easily and drawn up out of the reach of tides. Recent studies in the Maine/Maritimes area have confirmed the importance of these factors and consolidated them into an empirical model of coastal site location for the Maritime Woodland period (see Black 1992:58-60; Kellogg 1982; Sanger 1988:92, 1996b:344).

David Sanger conducted the first long-term archaeological research project in the Quoddy Region (see summaries in Sanger 1987:1-6, 1996a:55). His work focused on Middle and Late Maritime Woodland semisubterranean house-pit features associated with

shell-bearing sites located on the northern mainland shores of Passamaquoddy Bay (e.g., Davis 1978; Sanger 1987), and showed that these dwellings probably were occupied by nuclear families. In some cases, several dwellings may have been occupied on the same site at the same time (Sanger 1988:94).

Faunal assemblages from mainland sites are dominated by cervids—especially deer (*Odocoileus virginianus*) and moose (*Alces alces*), fur-bearing mammals—especially beaver (*Castor canadensis*), ducks and geese (Anatidae), shorebirds (Alcidae), seals—especially harbor seals (*Phoca vitulina*), and shellfish—especially soft-shelled clams (*Mya arenaria*). Patterns of beaver tooth eruption (Stewart 1974), presence of migratory bird species (Sanger 1987:69), and lack of vertebrate fish remains (Sanger 1987:69, 76) indicate that these sites represent cold season occupations (Sanger 1982:199, 1987:68-71; Stewart 1974). Sanger (1988:91) found little evidence for subsistence change during the Maritime Woodland, at least in terms of species taken, and concluded that "despite the littoral setting, the impression is one of terrestrial hunter-gatherers utilizing relatively few marine resources" (Sanger 1987:84).

In contrast, my research in the insular Quoddy Region has focused on an array of site types—large and small, stratified and unstratified, shell-bearing and non-shell-bearing (Black 1992:21)—and shown that significant changes in Maritime Woodland technology, subsistence, and settlement can be detected, especially in well-preserved sites that were reoccupied repeatedly over long periods (Black 1991, 1992:35-38, 1993). Specifically, faunal assemblages from insular sites indicate Maritime Woodland peoples depended on a variety of marine mammals and fish—harbor seals, gray seals (*Halichoerus grypus*), Atlantic cod (*Gadus morhua*), pollock (*Pollachius virens*), haddock (*Melanogrammus aeglefinus*), and herring (*Clupea harengus*)—and a range of shellfish, including horse mussels (*Modiolus modiolus*), edible mussels (*Mytilus edulis*), and sea urchins (*Stongylocentrotus droebachiensis*), in addition to soft-shelled clams (Black 1992:117-118, 1993:56-86). This impression is reinforced by stable isotope analyses of residues from ceramic shards showing that some vessels were used to cook marine foods (Black 1992:112-117). Seasonality indicators, such as presence of vertebrate fish and season-of-death analysis of soft-shelled clams, reveal more evidence for warm season occupation (Bishop and Black 1988; Black 1992:116) than was found in mainland sites[4]. Further, niche breadth analysis (Black 1992:108-112) suggests that Late Maritime Woodland subsistence practices were less specialized and placed more emphasis on terrestrial resources than Middle Maritime Woodland subsistence practices.

Delineation of Maritime Woodland seasonal rounds has been a particularly contentious issue in the archaeology of the Maine/Maritimes area (cf. Deal, this volume; Petersen and Cowie, this volume). Most Maritimes archaeologists have been influenced heavily by seventeenth century ethnohistoric accounts of Native subsistence practices and settlement patterns (e.g., Christianson 1979; Davis 1991; Sanger 1987:68; Tuck 1984). The hypothetical settlement model presented by Snow (1980:44-47)—for Wolastoqiyik (Maliseet people) living in the St. John drainage—exemplifies this approach, suggesting that Native peoples occupied relatively permanent main villages at the heads of tide on river systems, moving seasonally to exploit littoral and marine resources on the coast during the warm seasons and terrestrial resources in the interior during the cold seasons. It is ironic that this model was enshrined in the literature at a time when regional specialists had begun to question both the data and the assumptions upon which it is based (cf. Bourque 1989; Sanger 1982).

Burns (1978), Stewart (1974, 1989), and Sanger (1982, 1987) established that sites on the shores of the Quoddy mainland were occupied predominantly in the cold seasons. At the same time, Bourque (1973) was establishing a similar pattern for comparable sites on the central Maine coast. It became commonplace for archaeologists working in the Maine/Maritimes area to argue that Maritime Woodland seasonal rounds were different from those observed by European explorers in the Early Historic period (Snow 1980:45, 302-303), to ascribe the differences to the effects of European contact (Bourque 1973; Burley 1981; Sanger 1982; Stewart 1989), and to question the applicability of the direct historic approach with respect to settlement patterns (Sanger 1996b:347).

Sanger (1996a:55; see also Stewart 1989:56-57) argues that most of the evidence underlying Snow's model is not directly relevant to the Quoddy Region, and that the small amount of relevant ethnohistoric evidence suggests Native peoples were wintering on the northern shores of Passamaquoddy Bay in the early seventeenth century (Sanger 1987:139). Sanger (1982, 1996a) contends that ethnohistoric accounts have conditioned archaeologists to assume that coastal foragers in the Maine/Maritimes area had settlement patterns involving coastal-interior seasonal transhumance. In his most recent contributions, Sanger (1996a:56-57, 1996c:521) has proposed a two-population model for Maine/Maritimes prehistory, suggesting that, throughout the Maritime Woodland

period, an adaptively—and perhaps ethnically—distinctive population inhabited year-round—and moved within—the coastal zone, interacting with a separate population inhabiting the interior (cf. Deal, this volume; Petersen and Cowie, this volume).

My analysis below is consistent with the two-population model, in part because of practical problems in inferring seasonal rounds involving coastal–interior transhumance from archaeological evidence in the Maine/Maritimes area. For example, the Charlotte County Archaeological Site Inventory (Blair and Black 1993), which includes the shorelines of the Canadian part of the Quoddy Region and the Grand Manan Archipelago, contains approximately 200 registered sites. At least 40 percent of these sites contain prehistoric components (most dating to the Maritime Woodland period). Ninety-five percent of the sites are located on, or immediately adjacent to, marine shorelines; less than 5 percent (<10 sites) are located in the interior of Charlotte County. Thus, even if archaeologists were convinced that the Native subsistence-settlement pattern recorded by early European explorers is applicable to Quoddy Region late prehistory, the archaeological evidence with which to evaluate such a conviction from an interior perspective is unavailable. Moreover, because interior habitation sites in the Maine/Maritimes area are notorious for their poor organic preservation (cf. Nash et al. 1991:217-218; Sanger 1996a:56; Stewart 1989:73), even if a substantial number of interior sites were located and excavated, archaeologists would not have the faunal information necessary to establish subsistence orientation and seasons of occupation for interior sites[5].

Sanger (1996b:335) characterizes Maritime Woodland peoples living in the littoral zone of the Maine/Maritimes area as having small-scale, band-level social organization and as residentially mobile "in response to seasonal availability of key resources" (Sanger 1996c:523). He believes (Sanger 1996c:523) that Native peoples did not practice significant food preservation and storage. Thus, in Sanger's (1996c:515) view, Maritime Woodland peoples would fit with Binford's (1980:16) model of cold climate foragers who did not store appreciable amounts of food. Binford (1980:5-10) defines "foragers" as groups who make residential moves among a series of resource patches, and who, rather than storing food, typically gather food daily[6]. He (Binford 1980:10-12) contrasts foragers with "collectors", who are logistically mobile, supply themselves through specially organized task groups, and typically practice food preservation and storage. Below, I present evidence indicating that Late Maritime Woodland peoples in the Quoddy Region may have been shifting from a subsistence-settlement pattern emphasizing residential mobility to a pattern in which logistical mobility played a greater role.

Nash and Miller (1987) argued for a mosaic of Native subsistence and economic adaptations in the Maine/Maritimes area during the Maritime Woodland and Early Historic periods. Below, I substantiate the point that the subsistence-settlement systems of pieces in this mosaic—of which the Quoddy Region is one—must themselves be seen as mosaic in the temporal dimension. Settlement-subsistence change should not be conceived as Native groups selecting alternate patterns from an abstract array of ideal settlement-subsistence types. Rather, the temporal mosaic of settlement-subsistence systems is an archaeological construct, created by an averaging of the subsistence and settlement choices made by Native peoples living in specific environments, during periods that we, as archaeologists, designate for our purposes according to criteria that we select.

EXAMPLE COMPONENTS

Sanger (1987) presents summary descriptions of Late Maritime Woodland components on the northern mainland shores of the Quoddy Region. Relevant details from his descriptions are summarized in the Appendix. In this section, I present brief descriptions of three earlier Late Maritime Woodland components on the shores of the insular Quoddy Region. These and other insular components also are summarized in the Appendix.

The Partridge Island Site

Native occupations at the Partridge Island site (Bishop 1994; Bishop and Black 1988; Black 1991, 1993) span the periods from the later part of the Early Maritime Woodland (ca. 400 B.C.) to the earlier part of the Late Maritime Woodland (ca. A.D. 700) (Figure 16.3). The Early Maritime Woodland occupations, which took place during the warm seasons, are represented by cultural material in a basal black soil deposit (sc1). This material is covered by a series of Middle Maritime Woodland deposits (sc2a, 2b, and 2c) consisting of shell middens in the central and shoreward parts of the site that accumulated during the occupation of substantial living floors (similar to those described by Sanger [e.g., 1987:26-27] as semi-subterranean house pits) at the landward edge of the

site. Middle Maritime Woodland occupations took place in all seasons, but evidence for cold season occupations predominate. The Partridge Island site also contains a twentieth century occupation, probably representing weir-tending activities, restricted to the active soil layer at the surface (scA).

The Late Maritime Woodland occupation at Partridge Island (sc3) was not recognized as a separate cultural component during the excavation and initial analyses of the site (e.g., Bishop and Black 1988). It was subsequently recognized because of similarities to the Late Maritime Woodland component at the Weir site (MacDonald 1994). The component consists of a substantial living floor and associated pit features in the central part of the site (Unit 4), and a gravel and black soil living floor beneath a peat deposit in Unit 1 at the shoreward edge of the site. The assemblage includes a few shards of shell-tempered, cord-wrapped stick-impressed ceramics (Bishop 1994:21-22) and a few flakes of probably exotic chert (MacDonald 1994:97-100). Faunal preservation is poor in Unit 1 due to the acidity of the peat soil and the near absence of shellfish remains (Black 1993:45); however, codfish (Gadidae) and herring (Clupeidae) bones associated with this component in Unit 4 suggest the Late Maritime Woodland occupations took place during the warm seasons (Black 1993:85) (Table 16.2).

While season-of-death analysis of soft-shelled clam valves indicates that shellfishing was mainly a winter/spring activity at Partridge Island, there is some indication of warm season shellfishing in sc3 (Black 1992:89, 1993:142). Late Maritime Woodland pit features were excavated into the Middle Maritime Woodland shell middens (see Bishop and Black 1988:27; Black 1991:210), a practice that may have incorporated earlier faunal remains into the later component, complicating seasonality interpretations.

The Weir Site

The Weir site (Black 1985:41-48, 1987:7, 1988:13-17, 1992:35-38, 65-78) is similar to the Partridge Island site in terms of structure and chronology; however, the near-surface layers of the Weir site are better preserved because the site is sealed beneath a 10-30 cm deep peat deposit, most of which has not been disturbed by

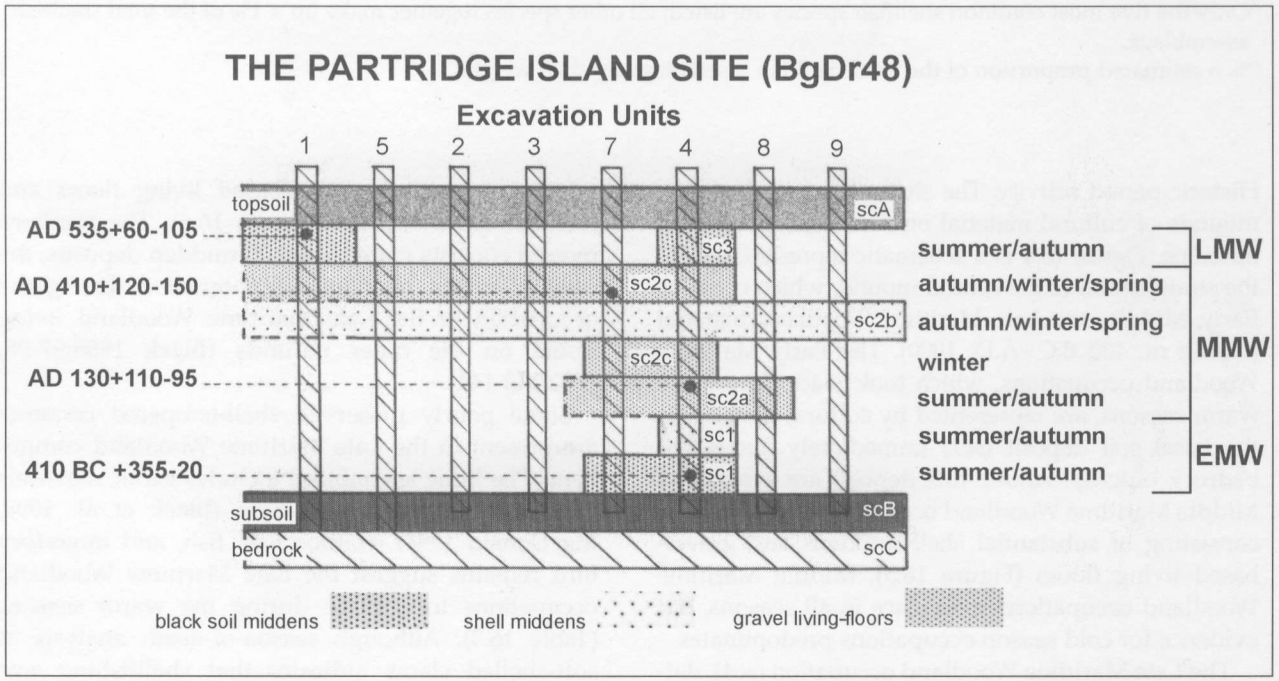

Figure 16.3. Partridge Island site: stratigraphy/chronology/seasonality schematic (adapted from Bishop and Black 1988). Vertical columns show how noncontiguous excavation units intersect stratigraphic units (stippled horizontal bars). (LMW = Late Maritime Woodland; MMW = Middle Maritime Woodland; EMW = Early Maritime Woodland; sc = stratigraphic component.)

Table 16.2. Faunal Remains Associated with the Partridge Island Late Maritime Woodland Component.

Taxonomic Designations	Common Names	Description	Quantity
MAMMALIA		calcined fragments[1]	
Castor canadensis	beaver	post-cranial elements[2]	MNI=1[3]
Canis sp.	(domestic?) dog		MNI=1
Phoca vitulina	harbor seal		MNI=1
Odocoileus virginianus	white-tailed deer		MNI=1
AVES			
Gavia immer	common loon		MNI=1
Somateria mollissima	eider duck		MNI=1
OSTEICHTHYES			
Pollachius virens	harbor pollock		MNI=1
Melanogrammus aeglefinus	haddock		MNI=1
Clupea harengus	Atlantic herring		MNI=4[4]
SHELLFISH[5]			
Mya arenaria	soft-shelled clam		41%[6]
Modiolus modiolus	horse mussel		34%
Mytilus edulis	edible mussel		9%
Nucella lapillus	dogwhelk		6%
Strongylocentrotus droebachiensis	green sea urchin		9%

Note: Data from Bishop and Black (1988:23) and Black (1993:59, 83-85).

[1]Not further identifiable; only calcined fragments found in Unit 1.

[2]Beaver cranial/dental elements are excluded from this analysis; most represent artifacts rather than food remains.

[3]MNI = minimum number of individuals.

[4]Most small fish remains were recovered from column samples; quantity is probably under-estimated as compared to other vertebrates.

[5]Only the five most common shellfish species are listed; all other species together make up < 1% of the total shellfish assemblage.

[6]% = estimated proportion of the total shellfish assemblage by shell weight.

Historic period activity. The site is composed of four mounds of cultural material on four distinct bedrock outcrops. Figure 16.4 is a schematic representation of the stratification of the central mound, which contains Early, Middle, and Late Maritime Woodland material (dating ca. 400 B.C.–A.D. 1000). The Early Maritime Woodland occupations, which took place during the warm seasons, are represented by cultural material in the basal soil deposit (sc1) immediately above the bedrock outcrop. Above this deposit are a series of Middle Maritime Woodland occupations (sc2 and sc3) consisting of substantial shell middens and gravel-based living floors (Figure 16.5). Middle Maritime Woodland occupations took place in all seasons, but evidence for cold season occupations predominates.

The Late Maritime Woodland occupation (sc4), dating ca. A.D. 700–1000, is more extensive, covering the earlier components on the central mound (Figure 16.5), and forming the bulk of the cultural material in the eastern and western mounds (MacDonald 1994). These deposits consist of a 5-25 cm deep black soil midden containing gravel-based living floors and rock-delimited features (Figure 16.6). The northern mound consists mainly of shell midden deposits, the bulk of which may have accumulated during the occupation of the Late Maritime Woodland living floors on the other mounds (Black 1985:97-98, 1992:143-144).

Some poorly preserved shell-tempered ceramics are present in the Late Maritime Woodland component. The lithic assemblage includes exotic materials from Nova Scotia and Maine (Black et al. 1998; MacDonald 1994). Harbor seal, fish, and migratory bird remains suggest the Late Maritime Woodland occupations took place during the warm seasons (Table 16.3). Although season-of-death analysis of soft-shelled clams indicates that shellfishing was mainly a winter/spring activity at the Weir site, one sample of clams associated with sc4 suggests warm season shellfishing (Black 1992:142). Poor organic preservation on the western mound and pit features excavated into earlier deposits on the central mound

(e.g., Black 1992:190) limit and complicate seasonality interpretations.

The Northeast Point Site

The Northeast Point site (Black 1985:26-27, 1987:8, 1992:40, 89-90) is structurally similar to the Late Maritime Woodland component at the Weir site; it consists of a black soil midden, containing gravel-based, rock-delimited living floors and hearth features, sealed beneath a peat soil deposit not disturbed by Historic period activity (Figure 16.7). The main difference is that Northeast Point is a single-component site—probably representing a single occupation dating ca. A.D. 700—lacking shell midden deposits.

No ceramics are associated with this occupation. The lithic assemblage includes a significant proportion of artifacts and debitage made of exotic chert from sources in the Minas Basin/North Mountain area of Nova Scotia. The few identifiable faunal elements preserved represent artifacts rather than food remains (Table 16.4); thus, there is no faunal basis for seasonality inferences. Site exposure to the northwest suggests a warm season occupation[7].

THE MIDDLE–LATE MARITIME WOODLAND TRANSITION

Middle Maritime Woodland Period

Middle Maritime Woodland components are found in both insular (e.g., Weir, Camp, Partridge Island) and mainland (e.g., Ministers Island, Teachers Cove, Holts Point, Phils Beach, Simpsons Farm) locations. They are usually stratified above Early Maritime Woodland

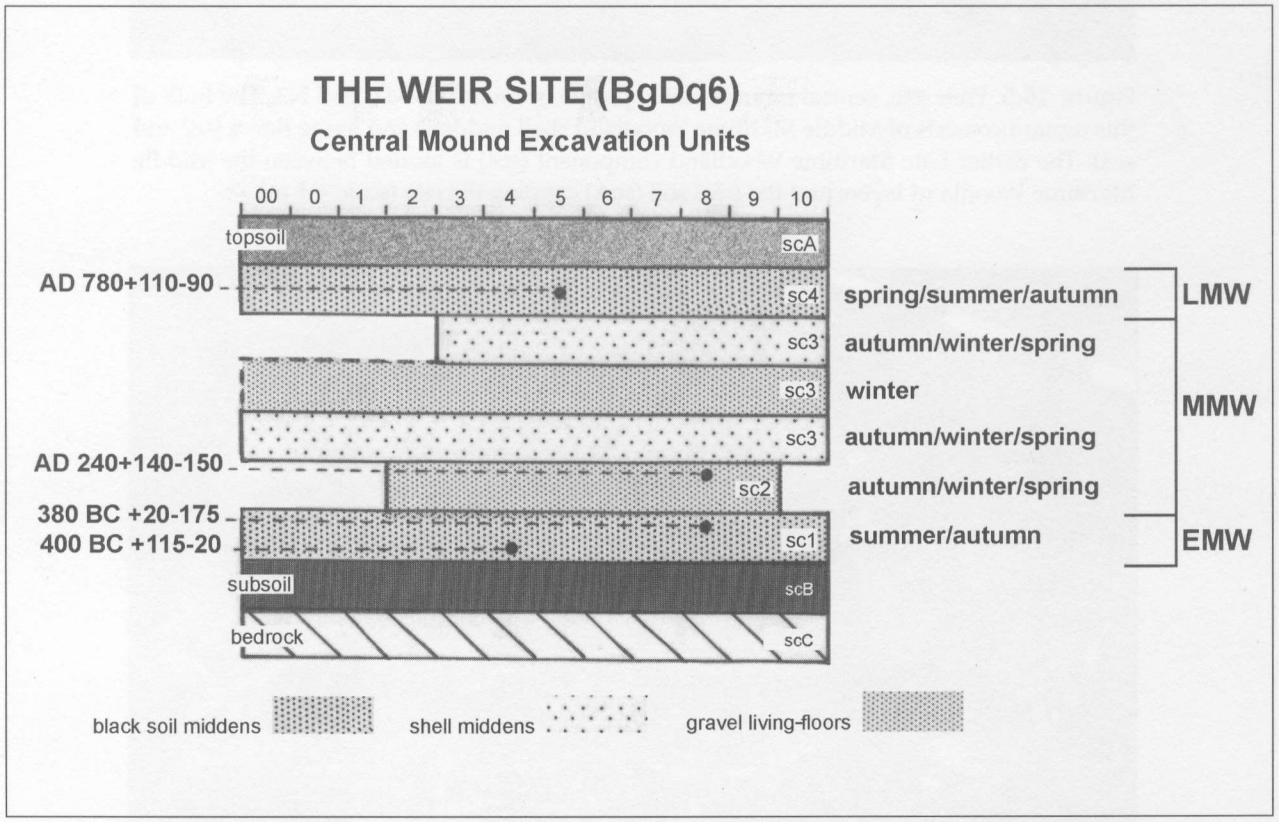

Figure 16.4. Weir site: stratigraphy/chronology/seasonality schematic (adapted from Black 1992). Numbers at top of block diagram show how contiguous excavation units in the central mound intersect stratigraphic units (stippled horizontal bars). (LMW = Late Maritime Woodland; MMW = Middle Maritime Woodland; EMW = Early Maritime Woodland; sc = stratigraphic component.)

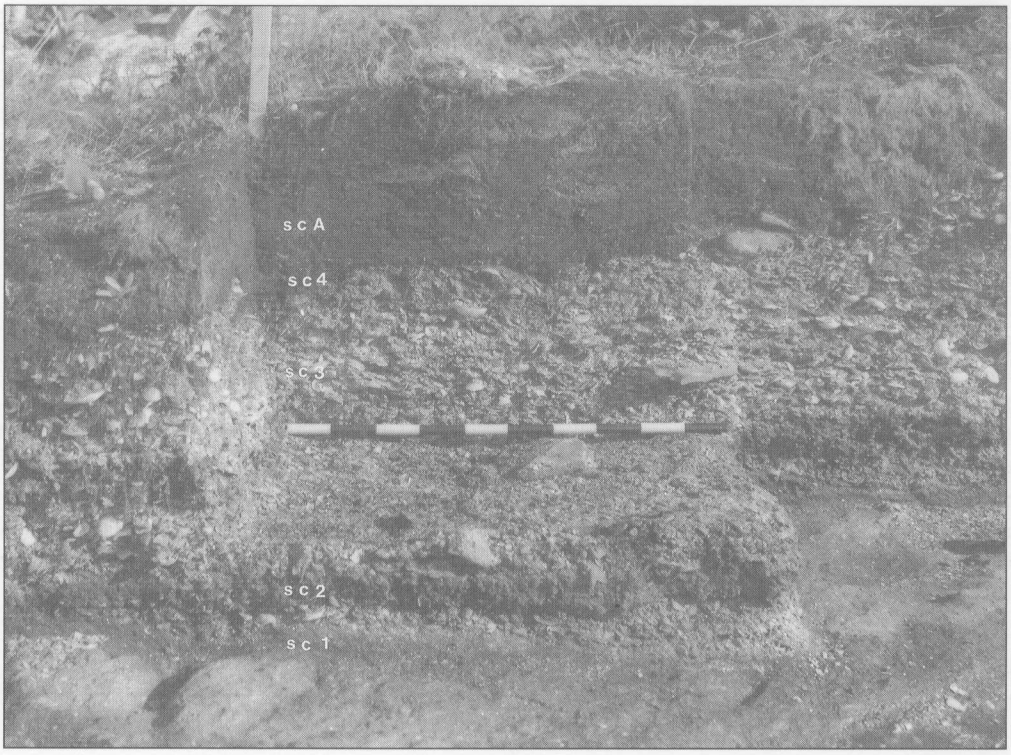

Figure 16.5. Weir site, central mound: north profile of units M1, M2, and N3. The bulk of this mound consists of Middle Maritime Woodland shell middens and living floors (sc2 and sc3). The earlier Late Maritime Woodland component (sc4) is located between the Middle Maritime Woodland layers and the peat soil (scA) capping the site (scale = 1 m).

Figure 16.6. Weir site: Unit W0W, layers 2 and 3. The peat soil and part of the black soil midden have been removed to show a linear arrangement of rocks representing the margin of a living floor dating to the Late Maritime Woodland period (scale: unit is 1 sq. m in area).

Table 16.3. Faunal Remains Associated with the Weir Site Late Maritime Woodland Component.

Taxonomic Designations	Common Names	Description	Quantity
MAMMALIA			
Mustela macrodon	sea mink		MNI=1[1]
Castor canadensis	beaver	post-cranial elements[2]	MNI=1
Canis familiaris	domestic dog		MNI=1
Canis sp.	(domestic?) dog	juvenile	MNI=1
Phoca vitulina	harbor seal		MNI=1
Alces alces	moose		MNI=1
AVES			
Gavia immer	common loon		MNI=1
Pinguinius impennis	great auk		MNI=1
Anatidae	ducks		MNI=2
Anas acuta	pintail duck		MNI=1
Somateria mollissima	eider duck		MNI=1
Uria aalge	thick-billed murre		MNI=1
Laridae	gulls		MNI=1
Corvus brachyrhynchos	common crow		MNI=1
Ectopistes migratorius	passenger pigeon		MNI=1
Bubo virginianus	great horned owl		MNI=1
OSTEICHTHYES			
Gadidae (small)	small codfish		MNI=1
Gadidae (large)	large codfish		MNI=1
Gadus morhua	Atlantic cod		MNI=1
SHELLFISH[3]			
Mya arenaria	soft-shelled clam		51%[4]
Modiolus modiolus	horse mussel		14%
Mytilus edulis	edible mussel		<1%
Buccinum undatum	northern whelk		5%
Strongylocentrotus droebachiensis	green sea urchin		29%

Note: Data from Black (1992:100, 239-241, 243), Black et al. (1998), and Reading (1994).
[1]MNI = minimum number of individuals.
[2]Beaver cranial/dental elements are excluded from this analysis; most represent artifacts rather than food remains.
[3]Only the five most common shellfish species are listed; all other species together make up < 1% of the total shellfish assemblage.
[4]% = estimated proportion of the total shellfish assemblage by shell weight.

components, or above subsoil deposits containing scattered Late/Terminal Archaic artifacts. Often they have Late Maritime Woodland components stratified above them.

Middle Maritime Woodland components consist of substantial gravel-based living floors, and ephemeral living floors and hearth features interdigitated among substantial shell midden deposits. These components tend to be deep, and distinctly and complexly internally stratified. They exhibit good stratigraphic separation from other components, and excellent faunal preservation. Faunal assemblages suggest relatively specialized exploitation focused on marine resources. While indicators suggesting cold season occupations tend to predominate, warm season indicators occur in both insular and mainland components, and warm and cold season occupations are separable in well-preserved sites. These observations are consistent with a pattern of residential mobility in which small groups of people moved seasonally within the Quoddy Region, spending warm and cold seasons in either mainland or insular locations conditioned by the availability of resources and the locations of other groups of people.

Earlier Late Maritime Woodland Period

Components dating to the earlier part of the Late Maritime Woodland period occur in both insular (e.g., Weir, Camp, Northeast Point, Partridge Island) and mainland (e.g., Ministers Island, Carson, Holts Point,

Figure 16.7. Northeast Point site: units 13, 14, and 23. This single-component earlier Late Maritime Woodland site consists of rock and gravel features surrounded and covered by black soil midden situated between bedrock and an overlying peat deposit. The peat and black soil have been removed to expose a feature (horizontal scale = 1 m; vertical scale = 50 cm).

Table 16.4. Faunal Remains Associated with the Northeast Point Late Maritime Woodland Component.

Taxonomic Designations	Common Names	Description	Quantity
MAMMALIA		calcined fragments[1]	
Castor canadensis	beaver	incisor midsection[2]	MNI=1[3]
SHELLFISH			
Mytilus edulis	edible mussel	5 complete valves[4]	MNI=3

Note: Data from Black (1987:8, 1992:105, 238-239).
[1]Not further identifiable.
[2]Probably represents an artifact rather than food remains.
[3]MNI = minimum number of individuals.
[4]One valve has been drilled for suspension; all probably represent artifacts rather than food remains.

Eidlitz, Orrs Point) locations. These components are sometimes stratified above Middle Maritime Woodland and/or earlier components, are sometimes mixed with earlier material, or may be located as separate sites. Often, they are larger in areal extent than Middle Woodland components. Sometimes they are mixed with later Native components, and usually are mixed with Historic material.

Earlier Late Maritime Woodland components consist of substantial cultural gravel- or black soil-based living floors with associated pits and rock-delineated features embedded in substantial black soil middens. Shell middens, if associated, are located on the peripheries of the black soil middens. These components exhibit poor stratigraphic separation from earlier and later components. They also exhibit variable

and often poor vertebrate faunal preservation, even in undisturbed areas, due to the acidity of black soil middens and overlying peat deposits. Seasonality indicators in mainland components suggest cold season occupations; warm season indicators predominate in insular components.

These observations are consistent with a pattern of residential mobility in which groups of people (perhaps somewhat larger than Middle Maritime Woodland groups) moved seasonally within the Quoddy Region, preferentially spending the warm seasons at insular locations and cold seasons at mainland locations. Such a pattern may represent a polarization of the Middle Maritime Woodland settlement pattern. Components from this period, especially those in the insular Quoddy Region, contain evidence of long-distance exchange of lithic materials. The inferred change in settlement pattern could have been concomitant with the development of Late Maritime Woodland regional exchange systems (Bourque 1994:34-35), if most exchange took place at outer coastal locations during the warm seasons, when long-distance canoe travel was easiest and safest. Such components represent plausible precursors to large, warm season-occupied, coastal aggregation/exchange sites, such as Goddard (Bourque and Cox 1981; Petersen and Cowie, this volume; Sanger 1996c:523) dating to the later part of the Late Maritime Woodland on the central Maine coast.

Later Late Maritime Woodland Period

Components dating to the later Late Maritime Woodland period are located in both insular (e.g., Gooseberry Point, Pintlowes Cove, Lighthouse Cove) and mainland (e.g., Ministers Island, McAleenan, Simpsons Farm, Phils Beach) locations. While some of these components are stratified over, or mixed with Middle Maritime Woodland components, insular components are separate site locations. Both mainland and insular components often are black soil middens with shell admixtures; living floors and other features are absent or indistinct. These components tend to be small, located in surface deposits, and poorly separated from other components; most are mixed with Historic material.

Faunal preservation is variable, and, in general, vertebrate faunal remains are present in low densities. Seasonality indicators in insular components suggest warm season occupations. The seasonality of mainland components is problematic because faunal remains from later Late Maritime Woodland components may not have been distinguished from earlier faunal remains. Sanger (1987:100, 110) has argued that the later prehistoric components at Simpsons Farm and Phils Beach represent cold season occupations.

Ironically, in the Quoddy Region there is greater uncertainty about the subsistence and settlement patterns of the later part of the Late Maritime Woodland than for the earlier periods described above. I doubt that the Charlotte County Archaeological Site Inventory contains a representative sample of components dating to this period. Petersen and Cowie (this volume) raise similar concerns about site inventories in Maine and Vermont. Most later Late Maritime Woodland components examined to date in the Quoddy Region may represent short-term logistic forays for the purpose of procuring specific resources. This interpretation would account for their small size, low density of artifacts, debitage and food remains, and frequent separation from earlier residential site locations. Such components are consistent with a settlement pattern in which Native peoples had aggregated into a small number of larger settlement units, and practiced less residential mobility, but more logistical mobility, than in the earlier periods.

DISCUSSION AND CONCLUSIONS

In the Quoddy Region, the Middle-Late Maritime Woodland transition is marked by an apparently abrupt structural shift from the mussel-tinged blue-gray of the Middle Maritime Woodland shell middens to the humic-stained black of the Late Maritime Woodland soil middens. This shift coincides with changes in lithic artifact assemblages and lithic reduction strategies, a shift from surface-treated to decorated ceramics, the appearance of evidence for long-distance lithic material exchange, and a broadening of the subsistence base. The settlement system shifted from a pattern of residential mobility among warm and cold season-occupied—and perhaps year-round occupied—sites at both insular and mainland locations to one of residential mobility between warm season-occupied insular sites and cold season-occupied mainland sites. More field research is required to thoroughly document these changes. However, taken together they signal a significant reconfiguration of Maritime Woodland culture occurring about A.D. 650–750.

Perhaps the most salient conclusion that can be drawn from this study is that significant subsistence-settlement change took place among Native peoples

in the coastal Northeast outside the context of their developing or adopting horticulture. The structural shift in the archaeological record, documented here, is not restricted to the Quoddy Region. Coastal black soil middens containing evidence of pit features and warm season occupation appear at about the same time, in the archaeological records of other parts of the Maine/Maritimes area: Nova Scotia (Nash et al. 1991:216, 224; Sheldon 1991:233), Grand Manan (Blair 2000), the central Maine coast (Bourque and Cox 1981; Cox 1987), and the Casco Bay area (Hamilton and Mosher 2000). Such components may occur even farther afield, on the islands in Boston Harbor, for example (see Ludetke 1998:16-17). Presumably, the structural shift in coastal sites, from shell midden- to black soil midden-dominated components, must somehow reflect concomitant changes in Native subsistence-settlement systems.

How can the Middle-Late Maritime Woodland transition be accounted for? Archaeologists working in the Northeast often directly relate the appearance of substantial pit features in the archaeological record to Native peoples developing or adopting horticulture (cf. Petersen and Cowie, this volume). I suggest that the appearance of pit features, in the Quoddy Region archaeological record specifically, and in Maine/Maritimes coastal sites generally, is associated with the development of a more sedentary settlement pattern and with greater reliance on stored wild foods, rather than with the adoption of a horticultural economy. However, this assertion by itself sheds no light on the reasons for settlement and subsistence changes in the context of a littoral foraging lifestyle.

Population replacement at the Middle-Late Maritime Woodland transition has been raised (Bourque 1995:256-257) as a possible explanation, but continuities in ceramic technology and decorative motifs make this an unlikely scenario (cf. Deal, this volume). Population expansion may be indicated by the greater areal extent of some earlier Late Maritime Woodland components, as compared to Middle Maritime Woodland components. However, evaluating this variable is hampered by the complexity of determining how often and how long the (essentially internally unstratified) black soil middens were occupied (Black 1992:93; Sanger 1987:83-84; Sheldon 1991:232-233), even when, as at Weir and Northeast Point, they are relatively undisturbed and well separated from other components: Do they represent single occupations? A few seasons or years of intensive occupation? Or several decades—or even centuries—of low intensity intermittent occupations? Are all of these sites similar in these respects, or do they represent points on a continuum between the extremes of short-term-long-term, intensive-intermittent occupation?

Climatic and environmental change during the Maritime Woodland period, as it is generally characterized in the archaeological literature (e.g., Rutherford 1991:111-112; Sanger 1988:83-84), seems too gradual to precipitate an abrupt cultural reconfiguration. However, the Middle-Late Maritime Woodland transition coincides with the beginning of the Subatlantic period, several centuries of cooler climate (Anderson 2001:146, 164-165), and the later Late Maritime Woodland period coincides with the Medieval Warm period, several centuries of warmer climate (Anderson 2001:146, 166-167). In the future, it may be possible to link climatic change to the cultural and archaeological changes documented in the Quoddy Region.

The development of long-distance exchange systems involving Native peoples from Labrador and Newfoundland to northern New England (Black et al. 1998; Bourque 1994:34-35; Sanger 1988:94), indicates that sociological factors may have been involved in the Middle-Late Maritime Woodland transition. Loring (1988:50-53) suggests that exchange systems may have developed to compensate for the restriction of social networks created by subsistence practices focused on littoral and marine resources, and settlement patterns based around littoral locations. The issues of how and why the exchange systems developed, and how they interrelated with other aspects of Maritime Woodland culture, remain to be fully explored.

The evidence presented in this chapter also suggests a shift in the Native subsistence-settlement system marking the transition from the earlier to the later parts of the Late Maritime Woodland period at ca. A.D. 1000. There are indications that Native peoples in the Quoddy Region may have been shifting from a pattern emphasizing residential mobility to one emphasizing more permanent base camps and more logistical mobility. Ironically, while Snow's (1980:320) model of head-of-tide villages with satellite shell midden sites makes little sense for ancestral Wolastoqiyik living in the St. John drainage, it may be useful in accounting for the later Late Maritime Woodland settlement pattern of ancestral Pestomukatiyik living in the Quoddy Region. Sanger (1987:139-140) has argued that ethnohistoric evidence does not support the existence of permanent villages in the Quoddy Region. However, archaeologists working in adjacent parts of

the Maine/Maritimes area have argued for the development of "central places," such as the Melanson site in Nova Scotia (Nash et al. 1991) and the Turner Farm site on the central Maine coast (Spiess et al. 1983), and centralized "base camp areas," as at the mouth of the Miramichi River in northeastern New Brunswick (Allen 1984:23), during the centuries immediately before European contact.

If such settlements existed in the Quoddy Region, they may have been located at the sites of modern towns, such as St. George (head-of-tide on the Magaguadavic River) and St. Stephen (head-of-tide on the St. Croix River), and at the heads-of-tide on smaller streams, such as the Digdeguash (Figure 16.1). Evidence of these sites may have been destroyed by recent marine incursions or by Historic period constructions, such as mills, dams and highways, or may lay beneath the modern towns. Snow (1980:320) has noted the difficulty of finding late prehistoric village sites in other parts of the coastal Northeast.

If horticulture was practiced by Native peoples in the Quoddy Region—immediately before, at, or immediately after European contact—locations on the lower reaches of the river systems are those where it would most likely have been practiced. It is unlikely that Native peoples would have practiced horticulture at the coastal campsites that have received the bulk of archaeological attention because, even today, coastal and insular locations in the Quoddy Region are marginal for horticulture. At any rate, at this point no evidence for horticulture and little evidence for wild plant use exists, in part because of the difficulty and expense involved in acquiring assemblages of macrobotanic remains (cf. Petersen and Cowie, this volume).

Presently, there is no compelling evidence for exotic lithic materials associated with later Late Maritime Woodland components in the Quoddy Region. This raises the possibility that people inhabiting the region ceased participating in regional exchange systems after ca. A.D. 1000. However, an equally plausible scenario is that evidence for exchange dating to this period lies in a few undiscovered or uninvestigated residential sites at head-of-tide locations on the river systems.

In conclusion, in the Quoddy Region, the Middle-Late Maritime Woodland transition has been documented in coastal sites. Explanations for the reconfiguration of Maritime Woodland culture that corresponds to this transition are complicated by anthropogenic disturbance of transitional components during subsequent Native and Euro-Canadian occupations, by uneven faunal preservation, and by lack of recovery of carbonized plant remains. Thus, I have offered only tentative suggestions to account for this transition.

The earlier-later Late Maritime Woodland transition has not been adequately documented even in coastal sites, since the existing site inventory for the later Late Maritime Woodland period lacks substantial residential components and almost certainly is not representative of the Native subsistence and settlement system immediately before European contact. Components from this period investigated to date are small and impoverished in terms of artifact and vertebrate faunal assemblages. At this point, any attempt to account for this transition is premature.

The Quoddy Region is an important piece in the mosaic of Maine/Maritimes Native prehistory and history. In this chapter I have shown, using the Quoddy Region as an example, that Native subsistence-settlement systems in this area are not only spatially mosaic, but should be *expected* to be mosaic in the temporal dimension as well. I have raised more questions here than I have answered—however, the *expectation* of settlement-subsistence variation within the Maritime Woodland period is a crucial step in designing the studies that will address the unanswered questions.

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APPENDIX

Canadian Quoddy Region Sites and Components Dating A.D. 650-1300

Passamaquoddy Bay Mainland

Simpsons Farm (BhDt4). Radiocarbon Dates (RD): A.D. 1545+100-50 [740±60 B.P.] (B-11067)[s]; Ceramic Association (CA): CP5 (inferred from Hale 1985:19); Other Components (OC): earlier: Middle Maritime Woodland (inferred from Baird 1881); later: Historic; Location (LO): small point, exposed southwest; Structure (ST): large black soil midden, living floors, (peripheral shell middens?); Seasonality (SE): cold season (inferred from Hale 1985:14-18; Sanger 1987:iv, 110).

McAleenan (BhDr1). RD: A.D. 1295+120-80 [680±160 B.P.] (GSC-1313); CA: CP5 (Petersen and Sanger 1991:145); OC: none reported; LO: small cove, exposed south; ST: small, shallow, black soil, highly fragmented shell midden; SE: winter (Stewart 1974, 1989:69); autumn/winter/spring (Sanger 1987:89).

Ministers Island (BgDs10)[8]. RD: A.D. 1160+125-180 [900±180 B.P.] (GSC-1581), A.D. 990+165-210 [1060±140 B.P.] (GSC-1674); CA: CP4 (Petersen and Sanger 1991:171); OC: earlier: Late Archaic, Early and Middle Ceramic (Sanger 1987:106); later: CP6-7 (Petersen and Sanger 1991:176), Historic; LO: small cove, exposed south; ST: large, deep black soil midden, living floors, peripheral shell middens; SE: possibly year-round (Stewart 1974); winter/spring (Stewart 1989:69)

Carson (BgDr5). RD: A.D. 1120+95-100 [925±80 B.P.] (S-510), A.D. 920+75-135 [1120±65 B.P.] (SI-2187); CA: CP4 (Sanger 1987:86); CP5 (Petersen and Sanger 1991:145); OC: earlier: Late Archaic (Sanger 1987:32); later: Historic; LO: small cove, exposed southwest; ST: large, shallow black soil midden with shell admixture, living floors, peripheral shell middens; SE: late fall/winter/spring (Stewart 1989:69); November-April (Sanger 1987:69).

Teachers Cove (BgDr11). RD: A.D. 885+95-190 [1170±100 B.P.] (S-608), A.D. 745+65-55 [1635±60 B.P.] (S-609)[s]; CA: CP4 (Petersen and Sanger 1991:170); OC: earlier: CP3 (Petersen and Sanger 1991:138); LO: large cove, exposed southwest; ST: large, shallow black soil midden with shell admixture, living floors, peripheral shell middens; SE: autumn/winter/spring (Stewart 1989:69).

Eidlitz (BgDs4). RD: A.D. 710+95-50 [1290±80 B.P.] (GAK-1888); CA: CP4 (Petersen and Sanger 1991:141); OC: earlier: Late Archaic, Middle Ceramic (Sanger 1987:109); later: Historic; LO: small cove, exposed south; ST: small, shallow black soil and shell mixture; SE: cold season (inferred from Sanger 1987:iv, 110).

Phils Beach (BgDr1)[9]. RD: none; CA: CP5-6 (inferred from Sanger 1987:99; see also Bishop 1984); OC: earlier: Late Archaic, Middle Ceramic (Sanger 1987:100; see also Bishop 1984); LO: small cove, exposed southwest; ST: large black soil midden, living floors, (peripheral shell middens?); SE: warm and cold seasons, perhaps year-round (Sanger 1987:100).

Holts Point (BgDr9). RD: none; CA: CP4b, CP5 (inferred from Sanger 1987:101; see also Hammon 1984); OC: earlier: Late Archaic, Middle Ceramic (Sanger 1987:101); later: Historic; LO: small cove, exposed south; ST: large black soil midden, (living floors?), (peripheral shell middens?); SE: cold season (Sanger 1987:102); winter/spring (Hammon 1984:93).

Orrs Point (BgDr7). RD: none; CA: CP4-5 (inferred from Sanger 1987:98); OC: earlier: none reported; later: Historic; LO: point, exposed southwest; ST: large black soil midden, living floors, peripheral shell middens; SE: no faunal analysis conducted (Sanger 1987:102).

Insular Quoddy Region

Pintlowes Cove (BgDr61). RD: A.D. 1645+25-85 [680±50 B.P.] (B-57996)[s,10]. CA: no ceramics recovered; OC: later: Historic; LO: small cove, exposed southeast; ST: small, shallow black soil and shell mixture; SE: summer/autumn (Black 1992:147).

Lighthouse Cove (BgDr60). RD: A.D. 1560+100-65 [730±75 B.P.] (B-34191)[s]; CA: CP 5-6 (Petersen 1996); OC: later: Historic; LO: small cove, exposed southeast; ST: small, shallow black soil and shell mixture; SE: summer/autumn (Black 1992:147).

Gooseberry Point (BfDr3). RD: A.D. 1375+15-90 [660±50 B.P.] (B-4190), A.D. 1480+45-35 [830±60 B.P.] (B-34190)[s]; CA: CP5 (inferred from Black and Johnson 1986); OC: later: Historic; LO: small point, exposed south; ST: small, shallow black soil and shell mixture;

SE: warm season (Rojo 1987:221); spring / summer /autumn (Black 1990).

Weir Site (BgDq6). RD: A.D. 890+90-115 [1150±80 B.P.] (B-70008), A.D. 780+110-90 [1230±70 B.P.] (B-21140), A.D. 715+65-50 [1280±60 B.P.] (B-8198), A.D. 685+90-30 [1310±60 B.P.] (B-70010); CA: CP4, CP5 (Petersen and Sanger 1991:170; Petersen 1996); OC: earlier: CP2-3 (Petersen 1996); LO: thoroughfare, exposed southeast; ST: large, shallow black soil midden with shell admixture, living floors, peripheral shell middens; stratified between deep earlier components and culturally sterile peat soil; SE: Figure 16.4 (see also Black 1992:146-49).

Northeast Point (BgDq7). RD: A.D. 715+145-55 [1280±80 B.P.] (B-40899), A.D. 590+50-150 [1500±70 B.P.] (B-23160); CA: no ceramics recovered; OC: none; LO: small cove, exposed northwest and southeast; ST: large, black soil midden, living floors; stratified between bedrock and culturally sterile peat soil; SE: no direct seasonality information (Black 1992:147); warm season? (see end note 7).

Partridge Island (BgDr48). RD: A.D. 535+60-105 [1550±50 B.P.] (B-3968); A.D. 410+120-150 [1650±80 B.P.] (I-12381); CA: CP4-5 (inferred from Bishop 1994:84); OC: earlier: CP2 (Petersen and Sanger 1991:136); later: Historic; LO: thoroughfare, exposed southeast; ST: large, shallow black soil midden, black soil and shell mixture, living floors, (peripheral shell middens?); SE: Figure 16.3 (see also Bishop and Black 1988:31; Black 1993; Bishop 1994).

Camp Site (BgDq4). RD: A.D. 1635+15-140 [300±50 B.P.] (B-8196); A.D. 410+115-150 [1650±70 B.P.] (B-21138); CA: CP4a (Petersen 1996); OC: earlier: CP2; later: CP5-6 (Petersen 1996), Historic; LO: thoroughfare, exposed southeast; ST: large, shallow black soil midden with some shell admixture, peripheral shell middens; SE: spring/summer/autumn (Black 1992:147).

END NOTES

1. Recent controversies concerning the appropriateness of various systems of culture-historical nomenclature (e.g., Black 1992:9; Bourque 1995:169; Leonard 1995) underline the preliminary character of Late Prehistoric reconstructions in the Maine/Maritimes area.
2. I use this scheme throughout the chapter in place of the various systems of culture-historical nomenclature used by the researchers whose work I cite. Note that my terminology is somewhat different from that used by Deal (this volume) and Petersen and Cowie (this volume) for adjacent areas.
3. Presumably, these were predominantly birch-bark canoes during the Late Maritime Woodland period (Black 1992:152; Sanger 1988:91).
4. Burns (1978:38), probably influenced by ethnohistoric accounts, interpreted shellfish remains at the Teachers Cove site as evidence of warm season occupation. Stewart (1989:65) countered this argument by suggesting that paralytic shellfish poisoning (PSP) was a significant threat in warm seasons that would make cold season exploitation of shellfish more likely. I, in turn, argued that because of seasonal inconsistency in PSP outbreaks from year to year, because coastal residents develop resistance to PSP toxin, and because PSP has been exacerbated by recent environmental change, shellfishing would not have been limited to the cold seasons (Black 1993:87). Season-of-death analyses of soft-shelled clams from insular Quoddy Region sites indicate that most prehistoric shellfishing took place in the winter and spring; however, there also is evidence for warm season shellfishing (Black 1990; 1992:140-42).
5. This problem may be alleviated, to some degree, by the recovery and analysis of prehistoric plant remains, especially from interior sites; such studies are in their infancy in New Brunswick (cf. Leonard 1995:22), but see Black (1993:52-55), Deal (this volume), Deal et al. (1991:175), and Leonard (1996).
6. The residential mobility of foragers is "characterized by regular residential moves and the exploitation of areas immediately surrounding residential locations" . . . "normally moves are conducted by the entire group, which vacates one area for another" (Shott 1986:27). Collectors "employ mobility strategies that involve frequent and long-distance logistic forays mounted from residential locations"; "logistic forays are specialized moves executed by comparatively specialized task groups" (Shott 1986:27).

7. However, the exposure of this site to the northwest may result from erosion caused by sea level rise; it may have been sheltered to the north and exposed to the east at the time of occupation, a locational configuration consistent with many shell-bearing sites in the insular Quoddy Region.

8. This site is located on a large island that probably was attached to the mainland before and during the earlier part of the Late Maritime Woodland period.

9. This site is designated BgDr25 in some previous publications.

10. All radiocarbon dates were calibrated and converted from B.P. to B.C./A.D. using CALIB 4.2. In the Appendix, uncalibrated (B.P.) dates are shown in brackets following their calibrated (B.C./A.D.) equivalents; corresponding laboratory numbers are shown in parentheses. All dates are presented with one standard deviation ($\pm 1\sigma$) ranges; calibrated dates are rounded to the nearest half-decade. Dates measured on marine shell samples are designated by ^{s} following the date information; all other dates were measured on wood charcoal. Marine shell dates were calibrated using the MARINE98.14C dataset. Carbon in marine shells was assumed to be 100 percent marine in origin; no correction for local marine reservoir effects was included in the calculations. Dates on wood charcoal were calibrated using the INTCAL98.14C dataset.

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