Continuity and Variability in Lithic Use During the Woodland Period in Coastal Southern New England: The View from the Laurel Beach II Site

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Continuity and Variability in Lithic Use during the Woodland Period in Coastal Southern New England: The View from the Laurel Beach II Site

Presented by
Daniel M. Zoto, BA

University of Connecticut
2019
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For my parents

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Chapter 1 Introduction

The Woodland Period (3,000 – 500 BP) remains one of the most dynamic and least understood periods in the cultural history of Northeast North America. Our understanding of the Woodland Period is limited by issues of artifact chronology, regional taxonomy and biases in archaeological sampling. Research at the recently identified Laurel Beach II Site (84-76) located adjacent to the Housatonic River Estuary in coastal Connecticut (Figure 1) has the potential to shed light on the typological and chronological issues that cloud our understanding of the Woodland Period in southern New England.

Figure 1. Location of the Laurel Beach II Site.

In this thesis I will use data from the recently-excavated Laurel Beach II Site to investigate variability in stone tool use and behavior through time, including changes to regional connections that are based on lithic sourcing data. These results will be compared to published data from elsewhere in coastal southern New England to illuminate the degree of variability in lithic use, exchange networks, and sedentism that existed across the region during the Woodland Period. Specific research questions include 1) what types of technological behaviors can be
inferred from the Laurel Beach II lithic assemblage and how do these relate to the behaviors that led to the production and discard of the ceramics and faunal remains from the site? 2) What are the sources of the lithic raw materials and what can they inform us about changes in mobility and/or exchange networks through time? 3) What does the data from Laurel Beach II contribute to our understanding of the temporal and geographic range of the poorly documented Cape Stemmed point type? 4) How do the behaviors, regional connections and inferred degrees of sedentism that are represented at the Laurel Beach II Site compare to other Woodland Period sites in the lower Housatonic and Connecticut River valleys, elsewhere along Long Island Sound, Narragansett Bay, Cape Cod and greater coastal New England? 5) Do these data collectively support the inclusion of quartz cobble reduction manufacturing techniques and Narrow-Stemmed Tradition points into Early, Middle, and even Late Woodland toolkits?

In general, the Woodland Period can be characterized as a time of pan-regional similarities in certain aspects of material culture and subsistence practices that were concurrent with increasingly distinct localized differences in other facets of Native life. It can also be viewed as a time of divergence in both settlement practices and subsistence technology from the preceding Late Archaic Period, while at the same time maintaining a significant degree of continuity in foraging behavior with earlier times (e.g. Shaw 1996a). Over the span of the Woodland Period coastal resources became progressively more important and likely played a major role in the trend toward increased sedentism and with the addition of maize horticulture led to the establishment of clearly defined group territories late in the period (e.g. Braun 1974). The Woodland is divided, sometimes rather arbitrarily, on the basis of changes in material culture, settlement patterns, and the later adoption of tropical cultigens into Early, Middle and Late periods. Ultimately, the Late Woodland Period provides a foundation for understanding the
state of Native social, economic, and political organization in North America at the time of European exploration and colonization.

A major taxonomic and chronological issue of the Woodland Period concerns the continued use of Narrow Stemmed Tradition projectile points from the preceding Late Archaic Period. Despite having been reported in several Woodland Period contexts, Narrow Stemmed points are often assigned to the Late Archaic Period in the absence of radiocarbon dates or ceramics (e.g. Juli and McBride 1984; Lavin 2013; Versaggi 1999). The potential chronological misclassification associated with these points has likely skewed our understanding of chronology and settlement and subsistence patterns for both periods. Regional taxonomy has added further confusion to the chronological placement of Narrow Stemmed Tradition artifacts. For instance, the ability to compare the temporal association of these artifacts becomes more complicated by the various names that are used to describe these nearly-identical small, stemmed bifaces in the relatively small geographic area of the northeast. For example, these points can be referred to as belonging to the Narrow Stemmed Tradition, the Narrow Point Tradition, the Small Stemmed Tradition, the Squibnocket Complex, the Small Point Tradition and the Taconic Tradition depending on which northeastern state they are found in (e.g. Cross 1996: 55). Although far less prevalent, similar issues exist with the chronological placement and geographical distribution of Cape Stemmed type points which have vaguely been assigned to both the Late Archaic and Woodland Periods (e.g. Bradley 2005).

Taxonomic and chronological issues also surround ceramic artifacts of the Woodland Period. While ceramic analysis can contribute greatly to our understanding of the Woodland Period, the sometimes hyper-regionalization of ceramic typologies can also make regional comparisons challenging and conceal similarities across geographical space. For instance, Lavin
calls attention to the fact that Middle Woodland ceramics that have the same basic decorative attributes may be classified as one of eight different types depending on whether they are found in New York, Connecticut, or Massachusetts. These taxonomic differences can make the comparison of artifact types across prehistorically-meaningless state lines a formidable task.

Biases in archaeological sampling have also led to major gaps in our knowledge of the Woodland Period. For example, much more attention has been focused on Early Woodland mortuary complexes than habitation sites (Versaggi 1999: 46). In addition, archaeological surveys and systematic testing has historically been focused on major river valleys or in locations where concentrations of sites are known to occur from collectors, antiquarian writings and other sources. However, these biases have been somewhat diminished in more recent decades by the advent of cultural resource management (CRM) surveys that have required expansive linear testing through “marginal” upland areas that were previously neglected by archaeologists (e.g. Cassedy 1998; Leslie and Zoto 2017; McBride and Soulsby 1989). Unfortunately, much of the data collected by CRM surveys remains unpublished.

This work aims to use data from the CRM-excavated Laurel Beach II Site to generally increase our knowledge of the Woodland Period and to demonstrate the utility of CRM-generated data in addressing important archaeological questions. The Laurel Beach II Site contains multiple Woodland Period occupations that yielded numerous artifacts related to the Narrow Stemmed Tradition and a variety of local and exotic lithic materials. Furthermore, differences in lithic raw material use and subsistence practices between the site occupations provide an opportunity to investigate changes in regional social and exchange networks, settlement patterns, and questions of territoriality. Collectively, the goal of this thesis is to use
data from this site to address chronological problems related to Narrow Stemmed Tradition points and to investigate diachronic changes in regional social and exchange networks and territoriality in Woodland Period coastal southern New England.

The Laurel Beach II Site is a Woodland Period site containing a shell midden that is located on the east side of the Housatonic River estuary in present-day Milford, Connecticut. The site was identified in late summer 2017 during a CRM survey that was associated with drainage and road improvements and was subjected to a Phase II Site Examination Survey and a small Phase III Data Recovery Program later that year. Additional fieldwork was conducted by the author over the winter and spring of 2017 – 2018, resulting in a total of 4.25 square meters excavated. In total approximately 30% of the shell midden as located within the drainage improvement project area was excavated.

The Laurel Beach II Site consists of a 20 – 25 cm thick midden deposit with a dense lens of marine shell that varies between 8 and 20 cm in thickness and was intermixed with lithic debris, ceramics, faunal remains, and charred botanicals. The shell midden sits atop a B horizon soil that contained an array of lithic and ceramic artifacts. Early, Middle and Late Woodland components were identified by a combination of diagnostic artifacts and a series of radiocarbon assays (see Table 1 in Chapter 4). The shell midden was dated to the Late Woodland from hickory nut shells that returned radiocarbon dates of 895 +/- 15 years BP with a calibrated range (2-sigma) of 905-742 BP (1045- 1208 AD) (NOSAMS 44646) and 850 +/- 30 years with a calibrated range (2-sigma) of 898-690 BP (1052-1260 AD) (Beta 516861). The Late Woodland association of the shell midden was also supported by the presence of generally thin, finely-made ceramic sherds, some of which are decorated with cord-wrapped stick impression and bands of linear dentate stamping. Occupations associated with the underlying B-horizon were dated to the
Early and Middle Woodland Periods based on a late Early Woodland uncalibrated radiocarbon date of 2110 +/- 30 BP with a calibrated range (2-sigma) of 2153-1995 BP (Beta 516852) from wood charcoal and a Middle Woodland Fox Creek Lanceolate projectile point. A total of eight Narrow Stemmed points were recovered throughout the stratigraphic sequence including three from within the shell midden matrix, one of which was in close association with the 850 +/- 30 radiocarbon date. The only other projectile point recovered from within the shell midden was a heavily-reworked rhyolite point that most closely resembles the rare and poorly-dated Cape Stemmed type. Quartz cobbles and the use of Narrow Stemmed points appears to be consistent throughout the occupation of the site. However, differences in the composition of lithic raw material types are apparent between the shell midden and the underlying B horizon. Exotic chert is much more common beneath the midden and is seemingly associated with earlier occupations of the site. These data demonstrate that the Laurel Beach II Site provides an ideal context for investigating the chronological issues associated with Narrow Stemmed Tradition and other point styles, as well as diachronic changes in the degree of regional connections that is reflected by the presence of exotically-sourced lithic materials.

**Methods**

The research questions proposed at the outset of this introduction will be addressed through comparative analysis of the Laurel Beach II lithic assemblage with other Woodland Period sites located in similar coastal settings across the region. The manipulation of stone was a central focus in the lives of all prehistoric people including those of the Woodland Period in New England. Since stone artifacts are the most consistent and ubiquitous form of evidence available to archaeologists studying the past, this type of material culture provides the largest dataset from which to make regional comparisons. Multiple approaches were taken in the analysis of the lithic
artifacts from Laurel Beach II. Detailed descriptions of these analyses, including the definition of terms and specific measurements taken, are provided prior to the analysis and results section in Chapter Four. However, the general system of the analysis is as follows. To assess knapping behavior and reduction stages, debitage was characterized by raw material, flake type, platform type, and cortex amount. Flaked tools were categorized by type and blade/edge attributes were examined to aid in identification of their use. When possible, projectile points were assigned to named types to facilitate deciphering the chronology of site occupation. This step was also critical to addressing issues surrounding the chronology of Cape Stemmed points and the Narrow Stemmed Tradition. Finally, several methods including macroscopic comparison, X-Ray florescence analysis, and local field reconnaissance were employed to identify the raw material sources of the lithics present in the Laurel Beach II assemblage.

The lithic analysis was supplemented by a more concise examination of the ceramic, faunal, and botanical assemblages from Laurel Beach II. Ceramic sherds were described by size, and original position in the vessel (i.e. body or rim), temper, surface treatment and decoration. When possible, sherds were assigned to the Early, Middle or Late Woodland Periods to aid in deciphering the occupational chronology of the site. The quantity and composition of the shellfish assemblage was estimated by a combination of field notes and a meticulously-processed 9-liter soil sample, from which shell hinges of individual species were counted. At the time of this reporting a detailed analysis of large portions of the faunal and botanical assemblages has yet to be conducted. Nonetheless, the presence or absence of terrestrial mammal, fish, and botanical remains, as well as those that have been identified to species was used to provide insight to subsistence modes when making the regional comparisons.
The results of the Laurel Beach II analysis was compared to the lithic and other assemblages in published reports of Woodland Period sites in coastal southern New England. These included Woodland Period sites in the lower Housatonic valley (e.g. Cassedy 1998; Millis and Millis 2007), the lower Connecticut Valley (e.g. Lavin 1991; McBride 1984), Narragansett Bay (e.g. Bernstein 1990a, 1990b, 1993), and Cape Cod (e.g, McManamon 1984; Bradley 2005; Mahlstedt 1986; Moffett 1951). These comparisons concentrated on the types of technological behaviors and the composition of toolkits that were reflected in the various lithic assemblages. The presence or absence of quartz cobble reduction and the chronological placement of Narrow Stemmed Tradition points was a focal point of this comparative analysis. The extent of regional connections and inferred degrees of sedentism was compared by the ratios of locally and exotically sourced lithic materials. These connections were traced by the suspected sources of these materials. The results of the comparative lithic analysis were augmented by ceramic data from these sites, as well as the existence of shell midden features and the types of faunal and botanical remains present within them. Collectively, this comparative analysis was used to diachronically illuminate the degree of variability in lithic use, regional connections and sedentism over the course of the Woodland Period in coastal southern New England.

**Thesis Organization**

In Chapter Two I situate this research within the broader cultural context of the Woodland Period in the Northeast by focusing on diachronic changes in material culture, regional connections and exchange networks, subsistence practices, and settlement patterns. This chapter demonstrates a general trend of pan-regional similarities that developed into local cultural expressions as the Woodland Period progressed and the degree of sedentism increased. Chapter Two also highlights increasingly localized styles in ceramic form and decoration that
can be considered a proxy for the expectation that lithic acquisition should follow a similar trajectory as groups became more sedentary. Chapter Three explores possible reasons for the enhanced use of coastal resources during the Woodland Period and how their use influenced Late Woodland sedentism and territoriality. I review environmental factors that may have affected settlement and subsistence patterns during the Early Woodland which resulted in an intensified focus on coastal and riverine environments. Importantly, these coastally-oriented subsistence strategies persisted with enhanced significance through the remainder of the Woodland Period. In this chapter I also examine ethnographic, biological, and ecological evidence as possible reasons for the inclusion of shellfish in the diet, a common feature at most coastal Woodland Period sites. Chapter Three closes with a review of the evidence that suggests the establishment of semi-permanent settlements and defined territories that developed in coastal areas of southern New England during the Late Woodland Period. In Chapter Four I provide detailed background on the Laurel Beach II Site, the findings of the 2017 – 2018 excavations, the results of the assemblage analyses and their significance to the above stated research questions. In Chapter Five I make regional comparisons to further address the research questions and situate the Laurel Beach II Site in a regional context. Finally, in Chapter Six I summarize this research and make general conclusions. Ultimately, I aim to address chronological issues surrounding the use of Narrow Stemmed Tradition points in the Woodland Period and to produce an updated account of the diachronic variability in lithic use, regional connections, and sedentism that existed in coastal southern New England during the Woodland Period.
Chapter 2 the Woodland Period in the Northeast

The Late Archaic Period (6,000 – 3,000 BP) in the Northeastern United States is often viewed as a cultural “florescence” that is characterized by extensive variability in habitat use and assumed peak levels of population density (Cross 1996; Lavin 2013). Late Archaic settlement patterns consisted of large seasonal aggregations of people along rivers, inland lakes, and large wetland areas, and smaller task-specific sites in the interior and uplands (McBride 1984; Ritchie 1965; 1969). Pan-regional connections are inferred by the distribution and similarity of stone tool making traditions such as the Laurentian (5,500 – 4,500 BP), the Susquehanna (3,800 – 2,700 BP), that have been attributed to both the diffusion of ideas and human migration (e.g. Dincauze 1975; Snow 1980). The Narrow Stemmed Tradition also originated during the Late Archaic Period and is considered to have developed in place in southern New England (Dincauze 1975). The end of the Late Archaic Period is noted for an increase in mortuary ceremonialism which has been interpreted as a communal response to elevated stress that was caused by social disorder and/or the depletion of food resources (Kraft 2001; Tuck 1975).

The Early Woodland Period (3,000 – 2,000 BP)

The Early Woodland is distinguished from the Late Archaic Period by changes in settlement patterns that coincided with the rapid and widespread introduction of ceramic vessels, the development of long-distance exchange networks, and the further elaboration of mortuary ceremonialism (Heckenberger et al. 1990; Pagoulatos 2012; Taché 2011). Site locations shift from inland lakes and rivers in the Late Archaic towards coastal environments, especially developing estuaries and salt marshes in the Early Woodland Period (Dincauze 1974; Shaw 1996a). The initial intensification of shellfish exploitation is evidenced at this time by the expansion in the size and frequency of shell middens in southern New England such as at
Greenwich Cove in Narragansett Bay (Bernstein 1993), RI-1428 on Block Island (Tveskov 1997), and the Hornblower II Site on Martha’s Vineyard (Ritchie 1969). In Connecticut, Early Woodland shellfish exploitation is evidenced by several discrete shell middens at the Waldo-Hennessy Site in Branford, Connecticut (McBride 1984). While there is indication of coastal exploitation in the Northeast during the Late Archaic, an unprecedented increase in coastal/maritime adaption began around 3,000 years ago with the onset of the Early Woodland (Braun 1974). This shift in subsistence patterns is also demonstrated by detailed studies of faunal assemblages and stable isotopes measured in human skeletal remains from the Gulf of Maine, which suggest changes in the ratios of terrestrial and maritime foods in the diet and a possible year-round occupation of the coast (Bourque 2001; Bourque and Krueger 1994; Sanger 1988). Collectively, these data suggest there is an overall increase in the exploitation of coastal resources in New England that coincide with the Early Woodland Period.

The defining technological element that marks the transition to the Woodland Period is the introduction of Vinette I ceramics around 3,000 years ago (Ritchie and MacNeish 1949). These coarse, grit-tempered, and cord-marked vessels occur in low frequency at sites from the Great Lakes to the Canadian Maritimes, including numerous locations in southern New England. Chronological variation for their introduction across this region is imperceptible, suggesting a rapid and extensive adoption of ceramic technology. Residue analysis of Vinette I vessels from 33 sites across the northeast, including the Lover’s Leap and Hopkins sites in the Upper Housatonic drainage of Connecticut and RI1428 on Block Island, demonstrated the presence of lipids derived from aquatic organisms in a large number of pots from both coastal and inland locations. These findings have been interpreted as an indication that ceramics developed to process freshwater and marine organisms at periodic social gatherings that occurred at times and
places of high resource abundance (Taché and Craig 2015). In a similar study that combined residue analysis with the ethnohistoric record, Taché et al. (2017) concluded the function of early ceramics was to produce highly-valued fats and oils to trade in novel interaction networks, or in feasting activities. It was in this way that the new technology became incorporated with the culinary traditions of Native Peoples in the northeast. The fact that Vinette I ceramics are nearly identical throughout the region suggests that Early Woodland groups may be interrelated in terms of technology and similarities may also be seen in stone tool assemblages.

While ceramics are an important chronological and technological marker, perhaps the most visible aspect of the Early Woodland is the elaborate mortuary ceremonialism associated with this period. Due to their archaeological visibility much of the research on the Early Woodland has focused on these practices, often overshadowing more mundane issues regarding settlement and subsistence patterns. However, study of these mortuary practices is important because it illustrates the degree that distant communities were connected in the Early Woodland. The elaborate Early Woodland burial activity was first defined by Ritchie (1937, 1944, 1955, and 1965) and referred to as the Middlesex and Meadowood Phases or Complexes. Both complexes are remarkably similar and include cremations, primary inhumations, and secondary inhumations or bundle burials, as well as artifacts including pendants, gorgets, birdstones, copper awls and beads, exotic bifaces, and tubular ceramic smoking pipes, and shell beads. Robinson’s (2015) in depth study of Early Woodland interactions determined there is no real difference between the Middlesex and Meadowood mortuary complexes (see also Heckenberger et al. 1990). Robinson (2015) demonstrated that Middlesex and Meadowood are thoroughly intermixed both spatially and temporally throughout their ranges by examining the spatial distribution of 36 Meadowood and 12 Middlesex sites and over one hundred radiocarbon dates associated with them. Both
complexes are represented in Connecticut including a Meadowood burial in Bristol (Lavin 2013) and a Middlesex burial in Milford (Nadeau and Bellantoni 2004). Distinctions between the two complexes appear to be related to a small number of specific artifacts, namely blocked-end smoking pipes made of Ohio fire clay, Turkey-Tail and Adena-like points made from Midwestern cherts that are associated with Middlesex and Onondaga chert bifaces that are considered to be diagnostic of Meadowood (e.g. Ritchie 1965; Robinson 2015; Taché 2011). However, mixing of these artifact types occur at the East Creek and Swanton cemeteries in the Champlain Valley, although Meadowood types dominate both assemblages (Robinson 2015). The pan-regional scale of this elaborate burial ceremonialism again suggests a largely interconnected population, which evidence of may be visible in aspects of material culture.

These interaction networks and exchange systems share similarities with those of the Late-Terminal Archaic suggesting that their origin is in earlier mortuary complexes and networks (Loring 1985), albeit with the addition of a few novel trade items. In the case of Meadowood, Onondaga chert bifaces became the main currency and defining characteristic in what Taché (2011) terms the Meadowood Interaction Sphere. This sphere is defined by the widespread distribution of Onondaga chert Meadowood cache bifaces and projectile points that have been recovered from the Saginaw Bay region of Michigan to the Atlantic Coastal Plain. Meadowood bifaces are often found in caches numbering in hundreds of blades. Examples from southern New England include the Smith Brook site in Glastonbury, Connecticut which contained a cache of 499 bifaces (Bourn 2002) and the burial at the Bristol site in the Housatonic drainage that was associated 160 Meadowood bifaces (Lavin 2013). Onondaga chert Meadowood cache bifaces are exceptionally standardized and where likely made by specialists. Their value may have been in their connection to highly skilled flint knappers rather than their raw material or functional
efficiency (Helms 1993; as cited in Taché 2011). The vast distribution of Meadowood manifestations fit Caldwell’s (1964; as cited in Taché 2011) idea of an interaction sphere, in that several regional cultures share supra-local values, rituals, behaviors, styles, and raw materials while retaining distinctive subsistence technology and local crafts (Taché 2011: 42).

Several explanations for the emergence of the Middlesex and Meadowood complexes have been postulated. The earliest favored ritual and the diffusion of a burial cult across northeastern North America (Ritchie 1955; as cited in Taché 2011). Later interpretations took an economic viewpoint and considered the interregional connections to be a risk-buffering strategy (Granger 1978, 1979; as cited in Taché 2011). The final explanation, and the one supported by Taché (2011) and Robinson (2015) is that the role of few individuals seeking prestige through privileged access to exotic goods played a critical part in establishing the long-distance exchange networks of the Early Woodland. This view is supported by and the small size of the cemeteries that are associated with these complexes, which suggests that only a limited subset of the population afforded burial within them (Heckenberger et al. 1990; Robinson 2015). Robinson (2015) suggests that those included in these cemeteries were magico-religious practitioners (aka shamans) who were able to manipulate esoteric and privileged knowledge that was considered to be essential for community maintenance. These aggrandizers were likely able to manipulate their specialized positions into sociopolitical inequality because of degraded environmental conditions and their associated stresses.

Evidence for stress and possible crisis-like conditions in the Early Woodland is found in the dearth of identified sites in the Northeast, which is thought to represent a dramatic decline in population density (e.g. Dincauze 1974; Fiedel 2001; Mulholland 1998). However, other researchers have argued that the paucity of sites lies in the inability to recognize the Early
Woodland when only specific types of diagnostic artifacts (i.e. bifaces and ceramics) are used as dating proxies. They contend that certain biface types, such as Narrow-Stemmed Tradition points, were in use both before and after the Early Woodland, and that ceramics may not be present at every site and therefore cannot be used as reliable proxy dating mechanisms (Filios 1989; Versaggi 1999). While taxonomic and chronological issues related to artifacts that are associated with these periods surely exist, they do not explain the scarcity of radiocarbon dates between 3,000 and 2,000 BP that has been observed in a number of regional studies. For example, of the 86 prehistoric radiocarbon dates from the Iroquois Pipeline Project survey that was conducted through the Hudson and Housatonic valleys only three dates fell between 3,000 and 2,000 BP, none of which were from 3,000 and 2,500 BP. This lack of dated contexts from the Early Woodland was paralleled by trends of few projectile point and ceramic types considered to be diagnostic of the Early Woodland that were recovered during the project (Cassedy 1998). The same phenomenon was observed in radiocarbon samples from surveys of the Housatonic drainage (Swigart 1974; as cited in Cassedy 1998) and the Upper Susquehanna Valley (Funk 1993; as cited in Cassedy 1998), as well as in McBride’s (1984) study of the Lower Connecticut River Valley. These data demonstrate that while the use of Narrow-Stemmed points likely spans several cultural periods, including the Late Archaic and Early Woodland (Boudreau 2016; Juli and McBride 1984; Lavin 2013), the shortage of radiocarbon dates from the third millennium BP support the notion that population decline was in fact a real phenomenon (Fiedel 2001; Lavin 1988).

The seemingly turbulent Early Woodland Period terminates around 2,150 – 1,900 BP with a considerable drop off in mortuary ceremonialism, changes in ceramic and stone tool technology, and increases in the size and frequency of sites (Shaw 1996a). These changes
suggest that the causes of the apparent instability that characterized the Early Woodland had ameliorated or had been successfully adapted-to by this time.

**The Middle Woodland Period (2,000 – 1,000 BP)**

The Middle Woodland Period is differentiated from the Early Woodland by the diversification of ceramic styles, increased regionalism and the reorganization of interaction and exchange networks, as well as, changes in stone tool types, and burial practices. The period is also marked by an increase in site density, and indications of increasing sedentism especially in riverine environments and along the coast (Shaw 1996b). The exploitation of estuarine environments that intensified during the Early Woodland continued to expand and shellfish become a heavily relied upon contribution to the diet (e.g. Lavin 1988, 2013; Shaw 1996b). Following Dunford’s (1992; see also 2001) description of Late Woodland settlements on Cape Cod, Bragdon (1996: 55-59) refers to this type of settlement pattern as “conditional sedentism” where groups occupy more or less bounded estuarine zones for most of the year.

The Middle Woodland is perhaps most prominently characterized by innovations in ceramic technology, marked by great variety in vessel form, treatment, and decoration (Shaw 1996b). Generally, vessel surface treatments and decorations that are characteristic of the Middle Woodland include both cord marked, fabric impressed and smoothed surfaces with dentate, rocker, and punctate stamping, cord-wrapped stick impressions, and occasionally scallop shell stamping near the rims of vessels (e.g. Childs 1984a). These innovations appear to become more regionally distinct through time suggesting a decline in regional connectedness. However perceived changes in connections that hinge on ceramic data should also be apparent in lithic assemblages, either in changes in raw material preference and/or stone tool design. Based on vessel shape and decorative attributes numerous ceramic traditions, phases, and stages have been
proposed for the region (e.g. Fowler 1966; Ritchie and MacNeish 1949; Rouse 1947; Smith 1947). These early taxonomic systems provide generally accurate chronologies of ceramic attributes. However, assigning subtle variability in ceramic design to different types has obscured similarities in ceramic construction and design and made comparisons across state lines difficult (e.g. Chilton 1998; Goodby 2002; Luedtke 1986; see also Lavin’s 1987 and 1998 assessments of the Windsor Tradition). This confusion is perhaps best illustrated (inadvertently) by Lavin (2002) when discussing Middle Woodland dentate and rocker-stamped decorated ceramics. She states:

This style of pottery is called by several type names, depending on the geographical region in which it was found: Vinette Dentate, Vinette Complex Dentate, and Point Peninsula Rocker-Stamped in New York and Western New England; Matinecock Point Stamped, Clearview Stamped, Linear Dentate, and Rocker Dentate in Southern New England and coastal New York, and Wheeler’s Punctate-Dentate in northeastern Massachusetts (Lavin 2002: 158-159).

Further complicating the issue is that aside from recognizing Early Woodland Vinette I ceramics as a pan-regional phenomenon, researchers in northern New England have largely avoided the labeling of specific ceramic types altogether, focusing only on technological and decorative attributes (e.g Bourque 2001; Petersen 1980, 1985; Starbuck 2006). In this discussion, particular technological and decorative attributes will be emphasized over typology to facilitate coherent comparisons of the variability that characterizes Middle Woodland ceramics throughout the region.

In addition to providing general temporal markers, and despite the complications surrounding local typologies ceramic analysis has granted important evidence for an increased
regionalism that developed during the Middle Woodland. Differences in ceramic decoration and manufacturing technique suggest increasing spatial distinctions between populations living in northern New England, those in southern New England and coastal New York, and those in central, western, and northern New York State (Shaw 1996b). While the full array of decorative variability in Middle Woodland ceramics is seen throughout the region, there are bounded areas where certain designs tend to dominant. In southern New England and coastal New York vessels are most often decorated with dentate or cord-wrapped stick impressions (e.g. Juli and McBride 1984; Lavin 1987; McBride 1984; Ritchie 1969) while those in northern New England are dominated by pseudo-scallop-shell impressed decoration (e.g. Bourque 2001; Kenyon 1986; Petersen 1980). Evidence for this stylistic boundary was first reported in Petersen’s (1980) study of Middle Woodland ceramics at the Winooski Site in Chittenden County, Vermont, where he found that the Champlain Valley ceramics were only generally related to those in southern New England and more similar to those from northern New England, New York, and southern Canada. Later, Petersen and Power (1985: 143; as cited in Shaw 1996b) argued for a “major style boundary” between northern and southern New England based partly on differences in ceramic surface decoration. This stylistic break is best demonstrated in the Merrimack River Valley where a distinction in ceramic types is seen occurring in the vicinity of Manchester, New Hampshire. Along the Merrimack cord-wrapped stick impressions and dentate stamping were present throughout the valley, while rocker-stamping and scallop-shell impressions were restricted to its upper reaches (Kenyon 1986). The origins of pseudo-scallop-shell and dentate-stamped decorations are likely in the northern extent of the region, as evidenced by a 2,690 +/- 50 BP date for these designs at the Oxbow site in New Brunswick, Canada and a similar date at Kidder Point in Maine. In contrast, the earliest dates for dentate-stamped ceramics in southern
New England occur around 1,800 BP, suggesting diffusion of this style from the north (Kostiw 1995). However, it remains unclear why dentate stamping became prominent throughout the region while the popularity of other styles was more restricted. Petersen’s (1980) study of the Winooski assemblage also demonstrated an increase in decorative variability of ceramics through time, a trend that he noted is seen throughout the region. The ceramic data suggests that interactions were becoming increasingly localized during the Middle Woodland Period. To confirm the notion of increased regionalization, similar evidence pointing to increased localization should be found in settlement patterns and lithic sourcing data.

Ceramic evidence has also been used to suggest that distinct populations may have been living in coastal and inland zones. Studies of cordage impressions on ceramics across northern New England indicated dominate preferences for S-twist cordage and fabrics from interior sites, while fabrics manufactured on the coast were predominately made with a Z-twist. These differences persisted throughout the Early and Middle Woodland periods and have been interpreted as representing different learning networks or technological populations existing in coastal and interior environments (Petersen and Hamilton 1984; Petersen 1996). Distinctions in construction technology have also been suggested as occurring along the coast based on data from Long Island and Martha’s Vineyard. Data from these islands shows construction techniques changed from vessels tempered with grit and formed by coiling to those tempered with shell and shaped by paddle and anvil by the later part of the Middle Woodland (Funk and Pfeiffer 1988; Ritchie 1969 as cited in Shaw 1996b). However, Childs (1984b: 179-180) suggests these techniques may be complimentary, whereas vessels were first formed by coiling and then paddled to increase the bonding contacts between the coils and further thin the vessel walls. Choices in clay temper are likely related to the availability of raw material and the intended
function of the vessel (e.g. Braun 1983; Bronitsky and Hamer 1986; Luedtke 1986). A notable absence of shell temper at the Winooski Site (Petersen 1980), and the upper reaches of the Merrimack Valley (Kenyon 1986) may also indicate differential access to the coast and/or separate technological populations. The regional differences observed in the ceramic technology of the Middle Woodland can be seen as the foundations for the subsequent histories of these populations in the Late Woodland Period (Kostiw 1995; Shaw 1996b).

Despite the increased regionalism seen in Middle Woodland ceramic assemblages interregional connections persisted into this period, albeit with some reorganization. The expansive east-west oriented interaction spheres of the Early Woodland were replaced with more circumscribed north-south networks. Southern New England appears to have become more connected to the northern Middle-Atlantic region at this time (e.g. Lavin 2013). This exchange is seen in the Fox Creek phase of the early Middle Woodland and intensifies during the last few centuries of the second millennium BP with the introduction of the Jack’s Reef horizon.

The Fox Creek phase generally dates to 1,600 – 1,250 BP and includes Fox Creek Stemmed and Lanceolate point forms, as well as Petalas bifaces or “blades,” that are typically found in association with dentate, rocker-stamped, cord-marked, fabric-marked, or net-marked ceramics (e.g. Funk 1968; Kostiw 1995; Moore 1997). Fox Creek sites have been found from the Chesapeake Bay to southern Maine, and are primarily located along major rivers and coastal areas suggesting a focus on aquatic resources (Kraft 2001; Shaw 1996b). For example, a buried cache of 127 Petalas blades that was struck through with a 13” copper needle at the Abbot Farm site near Trenton, New Jersey was interpreted as preparation for an anadromous fish harvest (Kraft 2001).
Interregional connections between the Middle Atlantic and southern New England during the early Middle Woodland are evidenced by many Fox Creek phase artifacts made of non-local lithic materials. For example, Lockatong Formation argillite from north-central New Jersey and southeastern Pennsylvania was used to make Fox Creek points at the Oakland Lake site on Long Island (Lavin 2013) and was suggested to be the source of early Middle Woodland artifacts at the Cooper Site in Lyme, Connecticut (Tryon and Philpotts 1997). Argillite quarries are known along the Upper Delaware Valley including an expansive boulder-quarry in Flemington, New Jersey that was possibly used during the Fox Creek phase (Staats 1989). Further evidence for exchange is found in the Glazier Blade Cache in Granby, Connecticut where 30 bifaces of remarkable consistency in form and size and made from non-local siltstone were dated to 1630 +/- 80 BP and 1590 +/- 60 BP (Feder 2004). A similar trend of non-local lithic material associated with Fox Creek points is also seen in the Massachusetts portion of the Connecticut River Valley (Moore 1997). However, Fox Creek artifacts in eastern Massachusetts and Cape Cod were usually made from local hornfels, rhyolite or quartz, although exotic argillites were sometimes used (Moore 1997; Towle 1986). Such differences in lithic materials associated with the Fox Creek phase across the region may be representative of the increased regionalism of populations suggested by ceramic variability. Lavin (2013) equates the presence of these non-local lithic materials with the movement of goods or people, or both, from the Middle Atlantic region. Data from the Middle Atlantic supports the notion of material exchange associated with populations using Fox Creek phase artifacts. There, a renewal in the movement of lithics from the western interior areas out to the Coastal Plain and then north and south through coastal areas is seen between 1,800 and 1,200 BP (Stewart 1994). While it remains unknown what may have been exchanged for these exotic lithics, jasper scrapers found in
association with beaver bone at the Reedy Meadow site in Pepperell, Massachusetts (Mahlstedt 1985 as cited in Goodby 2013) suggest perishable items such as prepared furs may have been involved in this trading network (Goodby 2013).

An intensification of this exchange is seen with the introduction of the Jack’s Reef horizon circa 1,350 BP. These new point styles were widely distributed across the Northeast and Midwest and are thought to be associated with the diffusion of bow and arrow technology (e.g. Boudreau 2016; Lavin 2013; Justice 1987; Ritchie 1971a). In New England, Jack’s Reef points are typically made from high quality chert and jasper that was likely sourced from the Hardyston Formation quartzite in southeastern Pennsylvania (e.g. Lavin 2013; Luedtke 1987; Strauss 1992; but see King et al. 1997). The fact that Jack’s Reef and Fox Creek points have been found together at several sites in southern New England and New York suggests the jasper associated with these points was likely moving along the existing exchange networks established early in the Middle Woodland Period. For example, these points have been found in association at the Army National Guard Camp site in Niantic, Connecticut (Lavin 2013), and in a tightly-dated context at the Schoharie Creek II Site near Albany, New York (Reith 2012). The two types were also attributed to the same tool kit on Thompson Island in Boston Harbor (Luedtke 1998). The presence of jasper blanks and the absence of early-stage reduction debitage in Connecticut also suggest that Jack’s Reef points were being brought to the region as late-stage blanks or finished tools (Lavin 2013). It has been speculated that the Jack’s Reef horizon was associated with the Hopewellian interaction sphere of the Midwest (Strauss 1992). However, Goodby (2013) points out that the importation of jasper in the second half of the Middle Woodland Period largely occurs after the collapse of the Hopewellian network circa 1,600 BP, and that evidence for Hopewellian influence in New England is sparse and not clearly associated with jasper or Jack’s
Reef points. Data from Western New York, where Hopewellian influence is clear, also does not support a link between Hopewell and Jack’s Reef (Rieth 2013) and lends credence to a Middle Atlantic connection.

There is a clear clustering of Jack’s Reef points along major riverine and coastal zones in New England. The coastal-bias is especially pronounced at jasper-bearing Jack’s Reef sites between Cape Cod and coastal Maine (Goodby 2013). Strauss’s (1992) study of the distribution of Jack’s Reef points in New England supports this coastal and riverine bias and calls attention to numerous cultural resource management surveys that have covered large portions of the interior and have not turned up Jack’s Reef related artifacts. This study also demonstrates that local lithics materials tend to dominate Jack’s Reef assemblages outside of Connecticut, although jasper or chert is present at a majority of these locations (Strauss 1992: Figures 3 and 4). This pattern may reflect local copies of these exotic point styles. The riverine and coastal bias of Jack’s Reef sites likely reflects a combination of exchange routes existing along major waterways and the increased focus on coastal resources that persisted through the Woodland Period.

Settlement patterns and the increased use of ceramics during the Middle Woodland support indications of increasing sedentism, particularly long the coast and major rivers. For example, in the lower Connecticut River Valley McBride (1984) documented an increase in settlement aggregation in the riverine areas during the Middle Woodland, with half of the identified sites associated with the developing tidal marshes. This pattern corresponds with a shift in the use of upland areas which becomes restricted to small task-specific forays with all residential moves likely taking place within the riverine ecozone. It is unclear if these settlement changes in the lower Connecticut River valley are related to the developing marsh system or groups positioning themselves within trade networks or both (McBride 1984: 311-315).
Settlement patterns on Cape Cod also indicate a compressed schedule of seasonal movement with groups moving between the upper and lower portions of estuaries and along interior ponds (Shaw 1996b). The increased incorporation of coastal resources into the subsistence base is particularly evident in regards to shellfish, which became a significant component of the Middle Woodland diet (Bradley 2005). The high frequency of shell midden sites throughout the region likely reflect maturing estuaries and expanding habitats suitable for supporting large shellfish beds (e.g. Braun 1974; Shaw 1996b). Estuary and salt marsh formation reconstructions such as those from Nauset Marsh on Cape Cod (Boothroyd et al. 1992 as cited in Bradley 2005) and the Connecticut River estuary (Patton and Horne 1991; 1992) support these interpretations. Data from an expansive shell midden at Greenwich Cove in Narragansett Bay suggests a relatively year-round settlement beginning during the early Middle Woodland. This relative sedentism was attributed to the rich resource base provided by the estuary, a freshwater pond, and two tidal rivers located within a kilometer from one another. The faunal assemblage from Greenwich Cove included multiple species of shellfish, terrestrial mammals, reptiles, waterfowl, and saltwater fish (Bernstein 1990a). Collectively, these data suggest that the initial shift in settlement patterns toward riverine and coastal zones that occurred during the Early Woodland intensified as these environments matured through the Middle Woodland Period.

The end of the Middle Woodland is somewhat arbitrarily defined by gradual modifications in ceramic styles and the bifaces styles that occur over several centuries and culminate between 1,050 and 900 BP (e.g. Shaw 1996b). The rather abrupt disappearance of jasper around 1,200 BP and the discontinuation of Jack’s Reef points seem to mark the beginning of these changes (e.g. Goodby 2013).
The Late Woodland Period (1,000 – 500 BP)

The Late Woodland is distinguished from the Middle Woodland Period by changes in biface design, innovations in ceramic technology, and the adoption of domesticated cultigens. The period is also characterized by the continued trend of fewer larger sites that started in the Middle Woodland and culminated in semi-sedentism and permanent use of the coastal zone in New England.

Archaeologically, the Late Woodland is most visible in the shift to the near-exclusive use of triangular projectile point types. These bifaces are commonly referred to as Levanna points and were typed by Ritchie (1971) in New York State. They became common after 900 AD and were widely distributed across much of the Northeast, the Middle Atlantic, and parts of the Midwest (Justice 1987; Ritchie 1971). While the distribution of Levanna points in both interior and coastal settings suggests that they were used for a multitude of purposes, evidence shows they were at least sometimes used in association with aquatic resources. For example, protein residue analysis of a Levanna point from Site RI-2621 on Block Island indicates that it may have been used to kill or process a fish of the Perciforms order such as a bluefish (Ives et al. 2018: 16). Furthermore, Luedkte (1994: 8-10) hypothesized that Late Archaic Squibnocket Triangle points were used in spear fishing, as the barbs of the triangle would help prevent a fish from wriggling off the spear. While this technical observation makes sense, Luedkte provides a more convincing argument by highlighting the irregular distribution of these points that appears to bias favorable fishing locations. For instance, on Cape Cod small triangles are numerous at sites around Nauset Bay, but nearly absent from High Head, a location that is well-away from fishing areas (Borstel 1984 as cited in Luedkte 1994). The deeply concaved bases of Levanna points, some of which are nearly V-shaped with prominent corner barbs (Ritchie 1971: 31) seemingly fit
Luedkte’s idea about the earlier Squibnocket Triangles. Boudreau (2016) suggests that largest examples of Levanna points may have tipped harpoons. In this view the dominate point type of the Late Woodland seems to be at least partially designed for riverine or coastal environments.

Innovations in ceramic construction and design are also prominent attributes of the Late Woodland Period. In general there is a somewhat dramatic increase in the number of vessels dated to this period, suggesting a more sedentary settlement pattern. Ceramic technology changed rather dramatically in the middle of the period, which may be related to changes in vessel function that were associated with the incorporation of maize and domesticated cultigens into the diet. After AD 1300, overall vessel shape changes from conoidal to globular with pronounced shoulders, necks, and collars (e.g. Childs 1984b; Lavin 1987, esp. Figure 2). Vessel walls generally become thinner and shell tempering tends to dominate assemblages, especially along the coast (Shaw 1996c). However, the replacement of grit tempering is not complete. For example, at the Old Lyme Shell Heap at the mouth of the Connecticut River, 31% of the Late Woodland vessels are mineral tempered (Lavin 1986). These differences suggest that the selection of temper is likely related vessel function or other considerations in the manufacturing process, such as survival during the initial firing, rather than simply the availability of tempering materials (e.g. Braun 1983; Childs 1984b). The properties of ceramics and their relationship to mechanical and thermal stresses have been conducted by numerous researchers attempting to ascertain the reasons for changes in ceramic technology (e.g. Bronitsky and Hamer 1986; Skibo and Schiffer 1989; Tite et al. 2001). Bronitsky and Hamer (1986) determined that fine shell temper was more resistant to both impact and thermal stress than coarse grit temper. They also suggested that firing requires similar temperatures regardless of the type of temper. However, shell tempered vessels take less time to fire, a factor that may have been a consideration in
reducing fuel costs. In a review of ceramic temper studies, Tite et al. (2001) concluded that high temper concentrations and a lower firing temperature produced pottery with the highest toughness and thermal shock resistance. Feathers (2006) found that shell-tempered vessels have greater fracture toughness than those with grit-temper and more significantly greater resistance to crack-growth, increasing the overall durability of the vessel. Shape was also found to have an effect on overall toughness, as the smaller radii of curvature of globular vessels makes them more resistant to fracture (Feathers 2006). These studies demonstrate that the globular shell-tempered of the Late Woodland were designed for increased durability, an important consideration as ceramics became used more frequently in daily culinary activities.

The regionalism observed in the decorative diversity of ceramics of the Middle Woodland continued into the beginning of the Late Woodland Period. However, by the end of the period there were broad similarities in style that were possibly related to Iroquoian influences (Shaw 1996c; Lavin 2002). In northern New England cord-wrapped stick and punctate stamping become the prevalent decorative techniques (Shaw 1996c). In southern New England vessels with overall cord-marked, scored or scratched, brushed or smoothed exteriors and smoothed interiors dominate ceramic assemblages. Decorations are less common than during the Middle Woodland and are typically limited to the neck and collar, they include scallop-shell stamping, cross-hatched designs created by dragging the lip of a scallop shell over the clay, bands of dentate stamping and occasionally cord-wrapped stick impression. Incising, stamping, and the mixing of decorative techniques into complex design fields became popular toward the end of the Late Woodland (e.g. Childs 1984b; Lavin 1986, 1987; McBride 1984; Pope 1953; Rouse 1947). By AD 1350, the collared-incised vessels that were produced in southern New England cannot be distinguished from the contemporary New York Iroquoian ceramic types (Lavin
These widespread innovations in ceramic design seen after AD 1300 were likely related to novel uses of ceramic vessels related to the adoption of domesticated cultigens into the diet.

One of the leading research issues regarding Late Woodland archaeology in the Northeast is the question of the timing and effects of adopting maize horticulture. It is generally accepted that in New England maize horticulture was adopted around AD 1000 (e.g. Chilton 2006; Hart and Lovis 2013; Lavin 2013; Little 2002). However, direct AMS dates on maize kernels from sites from the Hudson Valley to southern Maine demonstrate most dates fall between AD 1300 and 1600 (Chilton 2006: Tables 39-2 and 39-3). This is the same for beans, where direct AMS dating has demonstrated there is no evidence for their archaeological visibility in the Northeast prior to AD 1300 (Hart and Scarry 1999). Bendremer and Dewar (1994) view similar radiocarbon evidence as an indication of a relatively rapid dispersal of maize along the southern New England coast and up the Connecticut River. Little (2002) also demonstrates a widespread increase in the archaeological visibility of maize and beans in New England after AD 1250 and proposes they were adopted simultaneously, a point that “lends support to Roger William’s Indian tradition that maize and beans arrived together at Rhode Island” (Little 2002: 116). Furthermore, Bendremer and Dewar (1994: 373-375) note that in southern New England the remains of beans, squash, and sunflower have always been found in association with maize. Interestingly, these changes parallel the changes in ceramic technology that occurred in the later-half of the Late Woodland. Evidence from New York shows a possible correlation between changes in ceramic design and the adoption of domesticated cultigens. In a study of the history of collared-rim ceramic vessels in the Finger Lakes region, Brumbach (2011) saw some links between the systematic thickening of rims around the fifth century AD and changes in cooking practices that included the preparation of maize, wild rice, squash, and sedge (Brumbach 2011:
It seems likely that similar changes to ceramic technology in New England are also related to the adoption of maize.

The magnitude of intensive maize horticulture and its effect on the settlement and subsistence practices of Late Woodland groups has been greatly examined. The majority of evidence indicates that in New England the adoption of maize horticulture did not replace the foraging mode that previously existed (e.g. Bendremer and Dewar 1994; McBride and Dewar 1987; Shaw 1996c). Many sites that were in use during the Middle Woodland were used in a similar way during the first few centuries of the Late Woodland. For example, in the lower Connecticut River Valley McBride (1984) saw enough continuity in settlement and subsistence patterns to combine the later third of the Middle Woodland and most of the Late Woodland Period into the single Seldon Creek Phase.

While small quantities of maize have been found at numerous sites along the coast from Long Island Sound to southern Maine, it likely played a subsidiary role to wild food items in the coastal zone (Bendremer and Dewar 1994; Chilton 2006; Shaw 1996). The role of horticulture may have been more prevalent at inland riverine locations. For example, greater quantities of maize have been recovered from inland sites along the Connecticut River including 1,500 maize kernels at the Burnham Shepard site in South Windsor, Connecticut and 200 kernels from a single pit feature at Pine Hill in Deerfield, Massachusetts. However, a one-to-one correlation between the number of kernels and the importance of maize at a given site cannot be made. For instance, since a typical Northern Flint cob contains approximately 200 kernels, than even 1,500 maize kernels may represent only a few cobs (Chilton 2006: 540). While discussing permanent village sites in the Salt Ponds region of Rhode Island, Waller (2000) calls attention to the low quantities of maize that are recovered in general, even in contexts where its presence is known.
such as the Native American cornfield at the Sandy’s Point site on Cape Cod. Identifying possible reasons for the low quantities of archaeologically recovered maize, Waller (2000) cites biases in sampling, preservation issues with organic materials, and ethnographic accounts of how maize was processed showing that it would only incidentally allow kernels to become charred and therefore preserved. Unfortunately, the close association of both Late Woodland and Contact Period materials and radiocarbon dates from Sandy’s Point does little to clarify the extent of horticulture on the coast prior to European contact (Mrozowki 1994). However, Bernstein’s (1990a) faunal and botanical evidence from Greenwich Cove clearly demonstrates that coastal sedentism predates maize horticulture. As McBride and Dewar (1987) point out, the diverse resources of coastal and estuarine environments including reliable fish and shellfish populations could have supported the increased sedentism and aggregated settlements of the Late Woodland independently of the adoption of maize horticulture.

Regardless of the role of maize there are clear indications of semi-permanent settlement in coastal areas that predate European Contact. The best unequivocal evidence comes from the Salt Ponds region of Rhode Island. Intense long term occupation of the upper Point Judith Pond estuary at Site RI-110 is indicated by the presence of numerous post molds, storage and refuse pits, hearths, shell middens, and human burials. A wide range of artifact types including projectile points, knives, pestles, and stone and shell hoes indicate domestic activities associated with animal processing and horticulture took place at the site. Seasonality information from botanical and fish remains implies an early spring to late fall occupation, however the storage pits suggest occupation at the site was for more than a limited duration (Waller 2000: 141-144), and shellfish were certainly available year-round in Point Judith Pond. A significant duration of occupation has also been suggested at Site RI-2280, located midway between the
Quonochontaug Pond and Ninigret Pond estuaries. Evidence of two dwelling structures as well as numerous pit features and human burials at this site suggest this may have been a semi-permanent habitation (Leveillee et al. 2006). Interestingly, despite machine stripping of the topsoil shell deposits were not encountered at RI-2280. The absence of shell may be the result of the distance of RI-2280 from the edge of either salt pond. In general, the rich and diverse resource base surrounding the Salt Ponds region which including ready-access to estuarine environments, nearby uplands, and marine resources make it an ideal place to support semi-permanent settlements and the development of homelands (Leveillee et al. 2006).

Trends of semi-permanent settlement have also been seen elsewhere in coastal New England. In a study of Late Woodland settlement patterns of the Thames River in Connecticut, Juli (1994) found large habitation sites in the upper reaches of the estuary and smaller task-specific locations including shellfish processing stations which indicated year-round use throughout the estuary. In the Lower Connecticut River valley, McBride (1984) also found increased aggregation in coastal/riverine zones and small task-specific sites in the adjacent uplands during the Late Woodland. Importantly, faunal and botanical remains from the large riverine sites that McBride (1984: 326-327) located, including the Selden Island Site, indicated year-round occupation. Further evidence for semi-permanent coastal settlement in Connecticut was found at the Mago Point Site on Niantic bay in Waterford. Mago Point is a large shell midden dating between AD 850 and 910 with an extensive faunal assemblage that indicated spring, summer, and fall occupations indicating extensive use of the coastal zone through several seasons (McBride 1984: 324). Similarly, Dunford (2001: 24) described Late Woodland settlement on Cape Cod as “conditionally sedentary,” where groups seasonally relocated over short distances within defined territories that were focused on estuaries and salt marshes. He
cites the “nucleated, highly productive and predictable” resources of these environments as reasons for the increase in permanence of coastal settlement during the Late Woodland (Dunford 2001: 24-25). Analogous patterns are also seen further to the north in Maine. Data from islands in East Penobscot Bay suggests that seasonal movement was confined to within the coastal zone, between more and less sheltered sites in winter and summer and that year-round use of these islands was likely (Sanger 1996). Collectively, this evidence suggests that by sometime during the Late Woodland Period permanent settlements existed within the coastal zone throughout New England.

The Late Woodland Period ends with the arrival of European explorers in the 16th century. At this time Native Americans in the Northeast were brought into systems of European trade, resource extraction, and colonization. The forging mode that persisted for thousands of years gradually gave way to permanent settlements and eventually losses of land and territory.

As expected, variability in settlement and subsistence patterns existed within the 2,500 year duration Woodland Period history of New England. However, the archaeological record demonstrates a general trend of increased sedentism that is associated with the elevated importance of coastal and riverine resources.
Chapter 3 Intensification of Coastal Resources

When humans are faced with environmental change they respond with various behavioral strategies that are dependent on the severity of environmental transformation and their perception of it. Coping strategies may include adjustments to foraging behavior, spatial mobility, and technology and they may culminate in the manipulation of social complexity (Dincauze 2000: 74). Short term adjustments typically comprise of the intensification of resources, changes to exchange networks, and modification of seasonal settlement patterns. If new environmental conditions persist and these novel strategies continue to have a positive feedback, then the new behaviors will become the norm and a revision to the former modes of settlement and subsistence are unlikely to occur (Dincauze 2000: 75-77). As outlined below, the turbulent long term climatic changes that occurred in the northeast during the Early Woodland Period are likely the impetus for the beginning of subsistence and settlement strategies that characterized the remainder of the Woodland Period.

The Early Woodland Climate and the Intensification of Coastal Resources

Several researchers have postulated that the Early Woodland population decline and the shift of settlement toward the coast were the result of climate change (e.g. Dincauze 1974; Fiedel 2001). Facing hardships caused by climatic change, hunter-gatherers likely found an attractive alternative to failing subsistence modes in the productive estuary and salt marsh environments that were forming as the result of sea level stabilization around 3,000 BP (Bloom and Stuiver 1963; Dincauze 1974; Lavin 1988; Orson et al. 1987). Data from Connecticut appears to best fit a scenario of Early Woodland population decline with surviving communities grouped in the most productive ecological zones, possibly for longer durations of time (Lavin 2013: 151). The observed shift in settlement toward the coast would not only afford groups access to productive
salt marsh environments but also to increasingly important communication corridors (Shaw 1996a). While the paleoclimate record demonstrates some variability in moisture and temperature across the region during the third millennium BP, there is support for an overall shift to significantly drier and cooler conditions that coincided with sea level stabilization at this time.

**Paleoclimate Reconstructions**

Paleoclimate reconstructions in New England largely rely on data from lake sediments. Several studies have recently examined regional hydrosclimatic fluctuations by using ground penetrating radar and sediment core data to re-create past water levels in ponds from northeastern Pennsylvania to Cape Cod (e.g. Newby et al. 2011; 2014; Shuman and Burrell 2017). All of the studies found similar evidence of multiple centennial-scale droughts that have occurred since the mid-Holocene. The longest of these droughts lasted for approximately 800 years between 2,900 and 2,100 B.P., coinciding with the Early Woodland Period.

The beginning of this dry period is concurrent with the onset an interval of climatic cooling that peaked approximately 2,800 years ago. Such cooling intervals are part of the North Atlantic’s “1,500-year” cycle, also known as “Bond events” (Bond et al. 1997). The Bond 2 event which occurred between 3,300 and 2,500 BP corresponds with below-average temperatures in the far northeast of North America (Wanner et al. 2011). A general cooling of North America associated with the Bond 2 event is also seen in a continental-wide reconstruction of mean July temperatures. For instance, in a study that synthesized data from 752 fossil pollen records from across North America, Viau et al. (2006) saw an overall abrupt decrease in temperature after 3,000 BP.

Reconstructions of past vegetation have also inferred dry conditions in the northeast around the third millennium BP. An early pollen-based study from Rogers Lake in Old Lyme,
Connecticut suggests that the driest post-glacial time occurred between 5,000 and 2,000 years ago and that the present-day forest makeup was in place by 2,000 BP (Davis 1969). More recent pollen studies suggest periods of dry conditions during the late Holocene. For example, the pollen record from Wildwood Lake on eastern Long Island shows an increase in drought-tolerant pitch pine that coincides with declines in oak, hickory and beech between 4,000 and 2,000 cal. BP (Oswald et al. 2010). Dry conditions were also inferred from low levels of organic content between 2,900-2,600 and 2,200-1,800 cal. BP at Little Pond in central Massachusetts (Oswald and Foster 2011). The first of these dry spells coincided with the peak of the Bond 2 event (Bond et al. 1997; Wanner et al. 2011). Interestingly, the Little Pond data shows that despite the dry conditions, the pollen record varied little over the past 3,000 years, remaining dominated by oak (40-50%) with lesser percentages of beech, pine, hemlock, elm, hickory, and other deciduous tree species. This suggests that the vegetation assemblage may have been insensitive to a few centuries of dry conditions or that these climatic variations were not as dramatic as those that occurred during the early and middle Holocene (Oswald and Foster 2011).

In contrast, two studies have inferred a moist climate in the northeast around the third millennium BP. In a study of plant macrofossils, McWeeney (1999) interpreted the presence of fir needles preserved in clay sediments from the Quinnipiac River as an indicator of cool-moist conditions in Connecticut at 2,700 BP. Similarly, pollen and sedimentation data from Minnewaska and Mohonk lakes near Poughkeepsie, New York suggest wetter conditions between 4,100 and 2,300 cal BP (Menking et al. 2012). The cool temperatures inferred by these studies at least partially overlap with the Bond 2 cooling event. These data suggest that there was some variability in the moisture regime of the third millennium BP and there may have been isolated
areas that remained more attractive than others to foraging groups during the Early Woodland Period.

**Sea Level Rise and the Formation of Estuaries and Salt Marshes**

Generally, studies that focus on sea level change in southern New England are in agreement that sea level rise decreased from approximately 3 mm/year to 1 mm/year between 3,000-4,000 years ago and has remained relatively stable until a few centuries ago (Nydick et al. 1995; Orson et al. 1987; van de Plassche et al. 1989). Patton and Horne (1991) found that sea level curves in the Connecticut River estuary matched those constructed for marshes in Clinton, Connecticut and Barnstable, Massachusetts. These data support Oldale and O’Hara’s (1980) theory that sea level rise along the coast of southern New England had been remarkably similar over the past 6,000 years. Regardless of this agreement, the developmental history of the region’s salt marshes appears to be dependent on the interplay between the individual sedimentation rates of the estuary and sea level rise. For example, sediment core data suggests that the mouth of the Connecticut River underwent a phase of estuarine expansion began about 4,000 B.P., creating broad protected coves and mudflats. The major period of salt marsh formation in the Connecticut River estuary occurred later, between 1,700 and 1,000 BP (Patton and Horne 1991; 1992). Interestingly, similar data from the Patagunanset River estuary, located just 10 km to the east suggests that marsh formation there began 3,500 – 3,300 years ago with salt marsh dominating the estuary by 2,000 BP (Orson et al. 1987). It would be expected that the independent developmental histories of the region’s estuaries and salt marshes that occurred between 4,000 and 1,000 years ago would result in localized settlement patterns within the overall shift to the coast observed in the Woodland Period archaeological record, as appears to be the case in the greater Boston area (Dincauze 1973 as cited in Braun 1974).
Conclusion

The paleoclimate record of the northeast indicates climatic shifts including prolonged drought and decreased temperatures occurring during the third millennium BP that were not paralleled during the preceding Late Archaic Period. These environmental changes and their resulting stresses on Native groups likely resulted in expanded interaction networks, increased mortuary ceremonialism, and new subsistence strategies focused on coastal and riverine environments. Once firmly established these novel subsistence modes became the norm. Importantly the unprecedented intensification of coastal resources, including an increased reliance on shellfish which began during the third millennium BP continued with an ever increasing importance through the remainder of the Woodland Period. This trend culminated with a heavy dependence on shellfish resources during the Late Woodland Period.

Shellfish Exploitation and Hunter-Gatherers

Evidence for the intensification of coastal resources that was sustained throughout the Woodland Period is most visible in the numerous shell middens that dot the estuaries and tidal rivers along the Northeast coast. Human collection of shellfish has great antiquity. This long history is likely because most shellfish are sessile, predictable, and require little specialized equipment or knowledge to exploit (Erlandson 1988). In fact, shellfish collecting is a subsistence strategy that has been associated with a zero percent failure rate (Bird and Bird 2002). The application of foraging theory to studies of shellfish use among ethnographic and prehistoric foraging groups can provide great insight to the proximate and ultimate reasons why the use of shellfish has been so universal among coastal foraging groups. Considering these insights with certain aspects of shellfish biology and ecology it is quite clear why this resource was so notably exploited by Woodland Period populations in the Northeast.
Behavioral Ecology Models

Human behavioral ecology has adapted the evolutionary ecology theories developed by biologists to a broad range of topics important to anthropology and archaeology. Within the structure of human behavioral ecology, optimal foraging theory provides models to examine and evaluate hunter-gatherer subsistence strategies. In optimal foraging theory the benefits of prey items are evaluated in terms of caloric returns and their acquisition costs, including time spent in searching, pursuit, and processing (Winterhalder and Smith 2000; Winterhalder 2001; Bird and O’Connell 2006; Smith et al. 2014).

The prey choice model of optimal foraging theory assumes that if foragers are attempting to maximize their rate of energy input, then they should preferentially pursue resources with the highest post-encounter return rates and only include lower-ranked food items when the numbers of higher-ranked items are in decline. Expanding the breadth of the diet to include low-ranked items is linked to the number of higher-ranked prey items on the landscape, regardless of the abundance of the low-ranked items. Foragers should consistently bypass low-ranked resources if adequate numbers of high ranked prey items may be available (Winterhalder and Smith 2000; Smith et al. 2014). In this light the Early Woodland settlement shift to highly productive coastal zones and the inclusion of seemingly low-ranked shellfish during the may reflect environmental conditions that have reduced the numbers of high-ranked prey such as deer.

Alternatively, the sheer abundance and density of some shellfish species have led some researchers to propose that en masse these resources have increased return rates comparable to high ranking terrestrial prey (Madsen and Schmitt 1998; F.R. Thomas 2007; Whitaker and Byrd 2014). For example, a number of the assumptions of the prey choice model are not met when a forager preys on several resources simultaneously. In instances of mass collecting, search time
and handling time are not mutually exclusive. When prey items are collected together, those that would normally not exceed the harvest threshold in sequential foraging are collected regardless. The post-encounter return rate of items collected in mass is highly density-dependent and as their abundance increases, so does their return rate. Therefore in certain circumstances of prey density, high-ranked food types can be displaced from the diet with no change in their actual abundance. This disproves the misconception that changes in the quantity of low ranked food items are irrelevant to the application of prey choice models (Madsen and Schmitt 1998: 447). In a sense this treats a dense patch as a single prey item where groups of resources should be analyzed in terms of the overall handling costs and returns for the set of items collected as a unit (Madsen and Schmitt 1998: 447-448). These data may explain the continuation and increase of shellfish exploitation after the turbulent climate of the Early Woodland Period had ameliorated.

Ethnographic and archaeological data suggests that once collected, small species of shellfish may also be processed in mass, ultimately reducing their post-encounter processing time and thus raising their rank among prey items. By cooking shellfish in their shells and in large numbers the cost of processing can be reduced. Ethnographic work among the Anbarra of northwest Australia shows that in times of feasting, thousands of individual shellfish were cooked, still in their shells, in a matter of minutes in large steam ovens (Waselkov 1987: 100). The archaeological remains of charred marsh grasses and rockweed recovered from shell middens in Europe and North America indicate that steam-cooking of shellfish was a widespread practice (Waselkov 1987).

In a similar argument Whitaker and Byrd (2014) suggest that the decisions made by foragers concerning the collection of low-ranked shellfish are much in line with those made for collecting plant species. As with plants, when shellfish patches are known the return rates are
low but predictable as there is little search time and low risk in terms of the variability of returns. Furthermore, the relationship between collecting effort and returns does not significantly decline during a foraging event (Whitaker and Byrd 2014: 151).

**Dietary Contributions of Shellfish**

While shellfish often compare poorly to other resource types in terms of caloric content, their nutritional value cannot be ignored when assessing their role in subsistence among coastal foragers. The primary role of shellfish exploitation among foragers is likely protein related, as shellfish provide a high-quality protein source that contains all the essential amino acids and several mineral nutrients (Waselkov 1987; Erlandson 1988; D.H. Thomas 2014; K.D. Thomas 2015). Some researchers have proposed that at certain times of the year, particularly in the spring when the weights of terrestrial animals are at their lowest, shellfish harvesting can provide protein yields similar to that of deer hunting (Perlman 1980; Erlandson 1988). Obviously a large number of individual shellfish would need to be collected to be comparable to a single deer, no matter how scrawny they are.

The contribution of protein to the diet by shellfish can be quite substantial. Erlandson (1988) suggests that an individual’s minimum daily protein requirement of 40 grams can easily be met through the collection of shellfish. He cites experimental work in Alaska where 745% of the daily protein and 90.7% of the daily caloric need of an average adult could be gathered in minutes even by “novices” in already “heavily exploited” clam beds (Erlandson 1988: 103-104). Erlandson (1988) also demonstrates that assuming a 40 gram daily requirement, the entire monthly protein needs of a 25-person group could be met through consumption of only 5,625 freshwater mussels (*Proptera alata*).
In respect to the micronutrients provided by shellfish it is important to consider that whether or not nutritional requirements are consciously understood by foragers, nutritional deficiencies would result in decreased reproductive fitness (Erlandson 1988: 103). In a study of inland shell midden sites in central California, Eerkens et al. (2016) hypothesized that it was possible that shellfish provided important micronutrients, such as sodium or iodine, that were otherwise difficult to obtain in inland locations. The fact that nutrients such as fatty acids which are required for normal brain development and function are abundant in aquatic resources has led some researchers to hypothesize that shellfishing was linked to brain development in human evolution. This idea has failed to be accepted among biological anthropologists chiefly because large, elaborate brains evolved in humans everywhere, including in places where hominins had little or no access to aquatic foods (Klein and Bird 2016). Regardless, when available, aquatic resources including shellfish have provided an important nutritional supplement to foraging groups across the globe.

Shellfish Ecology

The ecology of shellfish also makes them desirable prey items for human exploitation. Shellfish are a unique subsistence resource in both their nutritional value and the ease at which they can be procured. The majority of species are either immobile or move within very narrow ranges. They are typically visible, either attached to rocks exposed during daily low tides or are readily seen on the flats, betrayed by their siphon holes or lines in the mud. These easily captured prey items are often available year round and in nutrient rich habitats, species such as mussels and certain gastropods can be concentrated in great abundance (Waselkov 1987; Erlandson 1988; Bird and Bird 2002; Erlandson et al. 2008; Thakar 2011; D.H. Thomas 2014; K.D. Thomas 2015; Whitaker and Bird 2014; Zangrando e al. 2017).
It has been often noted that shellfish collecting requires little specialized knowledge, technology, or bodily risk and that it can generally be done by any member of the community (e.g. Bird and Bird 2002; Codding et al. 2014; Raab 1992; D.H. Thomas 2014; Whitaker and Byrd 2014). Individuals such as children, women with young children, and elders who are commonly marginal to the subsistence economy can make significant contributions by collecting shellfish (Raab 1992; D.H. Thomas 2014).

The ecology of shellfish also makes them reliable prey items. Many species of mollusc have rapid repopulation and maturation rates that can make them resilient to predatory pressures (Codding et al. 2014). Most communities of near-shore shellfish are sub-sets of extensive metapopulations that can provide the planktonic larvae needed to replenish near-shore populations that become depressed (Thakar 2011; K.D. Thomas 2015). A single recruitment event can have the potential to introduce millions of new individuals (Thakar 2011). For instance, the estimated maximum production for an individual northern quahog (*Mercenaria mercenaria*) female during a single spawning season is 16.8 million fertilized eggs (Mackenzie et al. 2002: 2). Some fast-growing shellfish species can thrive under regular and intensive harvest pressure. For example, a California Mussel (*Mytilus californianus*) population can rapidly replenish itself after a harvesting episode has left openings on rocks where quickly growing younger individuals can adhere. Regular collecting from these types of habitats may have the auxiliary effect of increasing its productivity (Whitaker and Byrd 2014: 152).

*Seasonality of Shellfish Collection*

Seasonality studies on shellfish remains from middens across New England have indicated shellfish were harvested at different times of year depending on the geographical region and time period (e.g. Bernstein 1990a; Kerber 1985; Lightfoot and Cerrato 1989; Sanger
Shellfish biology can have an effect on the season of harvest, with certain species being more desirable food items at different times of the year. Most mollusk species have a higher meat to shell weight ratio, with a peak in protein and carbohydrate content just prior to and following spawning, which typically occurs in the spring (Waselkov 1987; Erlandson 1988). De Boer et al.’s (2002) work in Mozambique showed an increased contribution of bivalves into the diet during the winter months, as people regarded the winter as a better season for shellfish exploitation because they contain more flesh at this time. In more temperate climates a preference for shellfish collecting during the winter may be in part that colder temperatures during winter may act to refrigerate the shellfish and thus extend their edible window relative to other seasons (Eerkens et al. 2016). It has also been said that shellfish may be less palatable while in the process of spawning than at other times of the year (Waselkov 1987). Some mobile species may have considerable variation in the times they are available, such as the California hornsnail (*Cerithidea californicus*), which have highest near shore densities in March through November (Whitaker and Byrd 2014).

Most ethnographically observed foragers, even those who routinely collect shellfish, depend more on other animal and plant foods, and the season of shellfish harvesting may be related to schedules in availability of other resources. The efficiency of shellfish collection is often seasonally elevated relative to other components of the diet (Waselkov 1987; Klein and Bird 2016). For example, Eerkens et al. (2016) suggest that winter harvesting of shellfish in central California may be overshadowed by summer demands on women to process and prepare other food items for storage, and the need to gather newly ripening foods for consumption in the spring. Shellfish may have been a more attractive option in the winter when these other tasks were not important (Eerkens et al. 2016). The ethnohistoric record from New England indicates
that shellfish were an important resource to Native Peoples during both winter and summer (e.g. Williams 1643: 139-140 as cited in Karr 1999). This observation is supported by seasonality data from archaeological shellfish collected from middens between New York and Maine that indicate the harvesting of quahogs in New England occurred variably throughout the year (Lightfoot and Cerrato 1989).

**Conclusion**

The global archaeological and ethnographic record highlights the importance and benefits of shellfish gathering to the subsistence modes of foraging groups inhabiting coastal zones. Such benefits were not lost on the Native Peoples that inhabited southern New England during the last three millennia. It appears that once the contribution of shellfish to the diet increased in significance in the Early Woodland, the ecology of them made shellfish an indispensable resource for the remainder of the Woodland Period. The prevalence of shellfish exploitation likely became more important as Native populations grew and territories became more circumscribed and groups were forced to maximize the productivity of resources within their homelands.

**Territoriality in the Late Woodland Period**

The intensification of coastal resources that began in response to the environmental conditions during the Early Woodland Period escalated in intensity through the Middle Woodland and culminated in conditionally sedentary populations during the Late Woodland. This Late Woodland coastal sedentism appears to have resulted in the establishment of the defined territories that were recorded by European colonists during the 16th and 17th centuries. These territories have been inferred by studies of lithic raw materials and ceramic design elements, as well as by evidence of pre-contact violence and burial practices.
In a study of lithic sourcing on the Boston Harbor Islands, Luedtke (n.d.) observed differences in the distribution of “name brand” lithic raw materials between the northern and southern islands that seemed to geographically correspond with quarries located on corresponding sides of the Boston Basin. She found that northern sources such as Melrose Green rhyolite were associated with northern islands, while Braintree Hornfels was more abundant on the southern islands. Neither of these materials are known to occur in secondary deposits on the harbor islands and had to be obtained from mainland sources. The pattern is consistent with 17th-century writings that indicate the Charles River was a boundary between the closely related but politically separate Pawtucket to the north and the Massachusett to the south (Luedkte n.d.: 9-10). In a similar study of Late Woodland Levanna points from the combined Sudbury/Assabet/Concord drainage in eastern Massachusetts, Ritchie (2002) found that more than half of the points were associated with lithic sources located along the northern rim of the Boston Basin. These findings are in line with ethnohistorical accounts that suggest this drainage was on the periphery of the 17th century Pawtucket homelands. While approximately 10% of the Sudbury/Assabet/Concord assemblage was comprised of Blue Hills hornfels, this contrasts greatly with the hornfels-dominated assemblages of the Neponset and upper Taunton River drainages, which are in the heart of historic Massachusett territory (Ritchie 2002: 117-122). Similar patterns in lithic raw material sourcing are seen in Rhode Island. Waller (2000: 149) interprets the reliance on local lithic materials such as quartz, quartzite and argillite at RI-110 and surrounding sites as support for the notion that Point Judith Pond was an established tribal territory during the Late Woodland.

In interior Connecticut, evidence from the I-84 survey through the northeastern part of the state suggests a territorial divide in the eastern highlands that existed along the Willimantic
River. Differences in the distribution of Plainfield Formation quartzite, which is only available east of the river, along with patterns in site types and orientation led McBride and Soulsby (1989: 493-494) to conclude that territorial divides existed since the Late Archaic and fluctuated through time. These territories were most strongly pronounced during the Late Woodland Period. Site distribution and assemblage composition consisting of high percentages of exotic cherts during this time indicate that the area west of the Willimantic was used by groups centered along the Connecticut River and highland groups remained east of the Willimantic for most of the year. Although this is only one comparison it is interesting to consider that while territory on the coast appears to become more constrained, groups along the interior stretches of the Connecticut River were expanding into the uplands, possibly in response to restricted access to the lower reaches of the river.

Late Woodland territoriality has also been inferred from the archaeological record of Cape Cod. In an analysis of Late Woodland ceramics, Dunford (2001) concluded that Native Peoples residing around Pleasant Bay were using ceramic decoration to actively forge and express their social identity in an attempt to resolve or minimize conflict on an environmentally circumscribed landscape that was subjected to increasing demographic pressure (124-125). Late Woodland burial practices on Cape Cod also point to the concept of territory or homeland. McManamon and Bradley (1988) interpreted the Indian Neck Ossuary in Wellfleet as clear evidence of permanent coastal habitation and a sedentary way of life on the outer Cape. The ossuary dates to the 10th or early 11th century AD and contains the bones and cremated remains of at least 56 individuals which appear to represent everyone in a community that died during a certain period. McManamon and Bradley (1988) draw parallels between the Indian Neck Ossuary and ethnographic accounts of ossuary-use by the 17th century-Huron in southern
Ontario. In that example, ossuaries are built very near a sedentary village and receive remains from that village and those surrounding it for 10 or 12 miles. Modern interpretations of these accounts suggest that an ossuary served as centerpiece of ritual that was designed to reaffirm social ties between villages that had sprouted from a single location. In this scenario people residing in the outlying communities would collect the remains of their dead for reburial in the ossuary at the ancestral village at intervals of approximately 10 years (McManamon and Bradley 1988: 101). As there are an abundance of sites located within a few miles of Indian Neck that are clustered at Wellfleet Harbor, Nauset Bay and High Head, the Huron analogy seems particularly fitting and suggests the Outer Cape was a permanently settled homeland by 1000 AD.

The establishment of well-defined territories and inter-group competition has also been implied by evidence of violence that has been seen in some Late Woodland burials from across the region. In a review of bulletins published by the Archaeological Society of Connecticut between 1935 and 1965, McBride (2013: 279) that out of 119 documented burials, 15 percent (n=19) showed evidence of trauma-related injuries suggesting that intergroup conflict was more widespread than previously thought. Of the 19 burials that showed evidence of injury or mutilation, 25 percent (n=6, 5 percent of the total population of 119) were women and children (McBride 2013: 279). Specific examples of pre-colonial violence in Connecticut can be found in burials from Niantic, Westbrook, Bridgeport and Milford showed signs of death by trauma. The Niantic example consists of two males, one having been shot with fifteen arrows tipped with quartz triangles and bone, the other shot six times. The Westbrook grave consisted of a single individual with a bone point lodged in its spine. The Bridgeport burial contained the skeletons of three males. One with a projectile point imbedded in the ribs, another with a point in his skull, and the third had a fractured skull. Three burials in Milford also showed signs of traumatic death.
One consisted of an individual with a crushed skull and a point lodged in the tibia. The other consisted of a double burial, with both individuals having points in their ribs, and one having a fractured skull (Lavin 2013: 253). Pre-contact violence was not only restricted to coastal Connecticut. Three skeletons at the Purcell Site in Yarmouth, Massachusetts were embedded with stone projectile points and characterized as victims of a “massacre” by the excavators of the site. One skeleton at Purcell had the tip of a large felsite knife or projectile point embedded in the fourth lumbar vertebra that likely severed the spinal cord. The Purcell Site is poorly dated based only on the presence of two sherds of grit and fiber tempered ceramics, although the excavators believe it to be very late in the Late Woodland sequence and likely historic (Schambach and Bailet 1974). However, the lack of any European materials in the associated midden makes the historic association of Purcell unlikely. Violence has also been evidenced in Maine where two skeletons at the Goddard Site east of Penobscot Bay had stone projectile points embedded in bone (Shaw 1996c: 104). While these data constitute a small sample of the known burials that date to the Late Woodland Period in New England they indicate that not all relationships were peaceful and that conflict over resources or other factors arose at least occasionally prior to European contact.

The regional archaeological record demonstrates that well-defined group territories were established sometime during the Late Woodland Period, if not earlier. The formation of these territories was likely related to post-Early Woodland population growth and the protection of dependable resources areas such as the highly productive shellfish beds that had developed over the course of the Woodland Period.
Chapter 4 the Laurel Beach II Site (84-76)

The Laurel Beach II Site (84-76) was identified by a shovel test pit survey in the late summer of 2017 and was subjected to Phase II Site Examination testing and a Phase III Data Recovery excavation later that year. The project was under contract to the City of Milford and associated with proposed road and drainage improvements in the Laurel Beach neighborhood. I conducted further excavation within the road improvement project’s area of potential effect over the winter and spring of 2017 – 2018. Site 84-76 was originally named the “Laurel Beach Site” because it is located on property owned by the Laurel Beach Association. The II-designation was added to the name after it was discovered that although none of the area’s recorded sites were officially named “Laurel Beach,” several of them had been referred to as such in the literature (Coffin 1946; Bouchard 2007; Lavin 2013).

Laurel Beach Background

The Housatonic River is the second largest river in Connecticut and was a focal point for Native American groups throughout the pre-contact period. The river served as both an ecological resource and a transportation corridor that linked the coast of Long Island Sound with the mountainous interior of the Berkshires. The area that became known as the Laurel Beach neighborhood, located on the east side of the Housatonic Estuary near Milford Point was of particular importance in the subsistence and settlement patterns of Native groups during the Woodland Period. Attesting to the importance of the estuary are numerous pre-contact archaeological sites recorded within the Laurel Beach neighborhood, including one shell midden said to cover an area of 24 acres (Federal Writers Project 1939) (Figure 2).
The Laurel Beach area has a long history of artifact collecting and professional archaeological excavation. Most famously, the Eagle Hill Site (84-2 and 84-64) was excavated by the former President of the Archaeological Society of Connecticut, Claude Coffin, as well as, Warren K. Moorehead of Philips Academy, collectors Norris Bull, Edward Rogers and others. These early excavations (Coffin 1924, 1937, 1946) focused on acquiring museum-quality pieces and well-preserved skeletons for the excavators’ museum and private collections. Eagle Hill is reported to have produced 1415 fire pit features, long and round house floors, mounds, a large dancing or gathering area, bone implements, pottery, shell middens, stone tools made of jasper, flint, and quartz, a cache of jasper knives, and red ochre burials. The state archaeological site form lists the site’s integrity as “destroyed” by unprofessional excavations in the 1920s, 30s, and 40s. Later reporting of this area in the state’s site files incorporates almost the entire Laurel
Beach neighborhood into Site 84-64. This site, also known as Eagle Hill is described as a very large Late Woodland village site (OSA Site Form). The Laurel Beach II Site, along with other nearby sites, falls within this expanded mapping of Site 84-64. However, the boundaries of Site 84-64 were most likely conjectured on the basis of the rich history of artifact collecting that has occurred in the vicinity and are therefore not well-defined.

During the mid-1980s, excavations were conducted at the nearby Robillard Site (84-18) by the Greater New Haven Archaeology Society (Lavin 2013: 93). Cultural material recovered from the Robillard Site spanned the Late Archaic through the Woodland Periods and included Laurentian, Rossville, and Narrow Stemmed projectile points, pit features, postmolds, and a large stone hearth associated with steatite vessel fragments and cord-marked ceramics. In a comparison with the Old Lyme Shell Heap, Lavin (1992: 83) reports that the Late Woodland occupants of Robillard were engaged in shellfish processing and the manufacturing of stone tools through quartz cobble reduction. The site was also tested by Claude Coffin in the 1930s and 40s, pot-hunted by a local amateur archaeologist in the 1960s and 1970s, and surface-collected in the 1980s (OSA Site Form). Unfortunately, aside from a few casual mentions in the literature much of the information about the Robillard Site remains unpublished. At the time of the Laurel Beach II project this site was actively being looted as evidenced by a number of large rectangular pits that remained open, numerous backdirt piles and freshly cut roots and trees. Periodic checking on this unauthorized excavation over the winter of 2017 – 2018 revealed no artifacts aside from marine shell and fire-cracked rock in the looter’s backdirt piles.

In 1990, a possible Early Woodland Adena-related burial (84-51) was discovered during the construction of sewer line approximately 200 meters southeast of the Laurel Beach II site. The “Milford Burial” contained the skull and post-cranial elements above the clavicle of a young
adult male that were stained green and preserved through the leaching of copper salts into the organic remains. However, no copper was recovered from the grave. Presumed grave goods that were associated with the interment included a large (19 x 11-centimeter) biface, five large flakes, and two end-scrapers all made of high-quality yellow-brown jasper. Three of the jasper flakes were located in-situ under the cranium. An Orient-like projectile point made out of a mottled gray chalcedony that is reminiscent of Ramah chert from Labrador, Canada was also located in the backdirt of the trench. This point was assumed to be associated with the burial as no other artifacts or features were observed during the field inspection of the entire trench excavation. The possible Adena association was inferred by the authors because of the similarities of the large biface with other Adena/Meadowood bifaces found in New York and the presence of raw materials that are consistently exotic to Connecticut (Nadeau and Bellantoni 2004).

In the early-2000s, Michael Bouchard conducted excavations to the south of the Robillard Site at what he labeled the Laurel Beach Encampment (84-73). Bouchard’s excavation yielded Orient Phase and Narrow Stemmed projectile points, ceramics, and ground stone tools. The excavation also revealed seemingly discrete shell midden deposits comprised of unspecified marine shells, mammal and fish bones, and human remains (Bouchard 2007).

A pre-contact fish weir has also been identified within the adjacent salt marsh. The Smith Point Fish Weirs Site (84-19) is located at the mouth of the Housatonic River between Smith Point and Nell’s Island. The site, which was identified and investigated in the 1940s, includes a fish weir consisting of 406 linear feet of wooden stakes that individually measured approximately three inches in diameter (Coffin 1947). Although undated, the presence of this extensive fish weir which would have taken considerable construction investment suggests that it
was related to a group that was occupying the area over a significant length of time and/or could infer that the estuary was part of a defined territory.

It is probable that the Laurel Beach II Site is very closely related to the other archaeological sites in the immediate vicinity. Due to poor documentation of the early excavations and the lack of large-scale systematic testing throughout the area, the boundaries within this complex of sites on the east side of the Housatonic River Estuary are difficult to distinguish. The area has been described as containing extensive shell middens extending northward from Milford Point almost to the village of Devon which were probably the remains of numerous occupations during several time periods (Lavin and Thompson 1986 as cited in Bouchard 2007).

2017 – 2018 Excavations

The 2017 – 2018 excavations at the Laurel Beach II Site essentially encompassed four phases of archaeological fieldwork that I directed. The site was first identified in September 2017 when the shell midden was encountered in a single shovel test pit (STP) and an associated array or verification pit during a Phase Ib Intensive (Locational) Survey. The integrity of the deposit was confirmed in October 2017 with an excavation unit placed between the Phase I STPs that contained the midden deposit. Further excavation of the midden deposit was undertaken as a mitigation effort during a Phase III Data Recovery Program in November 2017. Intrigued by the shell midden, and the presence of seemingly exotic lithic materials that appeared to be in context with “classic” quartz cobble reduction, I obtained permission from the City of Milford and the Laurel Beach Association to conduct additional fieldwork within the area of potential effect (APE) of the City’s drainage improvement project. This fieldwork was conducted in December 2017 and continued in March and April 2018. There were a total of 4.25 square meters excavated
within the shell midden, along with two exploratory trenches which were used to remove modern overburden and expose the boundaries of the midden as they existed within the drainage improvement APE (Figure 3).

**Excavation methods**

Initial testing of the Laurel Beach II site consisted of shovel test pits dug at 10-meter intervals on transects that paralleled the roadsides within the drainage improvement APE. The shovel test pits were 50x50-centimeters in plan and were dug by hand with shovel and trowel in arbitrary 10-centimeter levels within natural soil strata until sterile C-horizon soils were reached. All soil was screened through 1/4-inch mesh, and stratigraphic profiles of every pit were drawn. The shell midden was encountered in a single test pit, labeled J1, at the very northern edge of the project area and an additional array, STP J1-S, was excavated 2-meters to the south to verify the existence of the site (Figure 4).

Due to the sites location at the northern edge of the project area and the constraints of the APE’s narrow impact zone, array pits were not dug to the north, east, or west. A transect STP located 6-meters to the south of J1-S that contained disturbed soils and no evidence of the midden deposit confirmed a southern boundary to the site existed between these test pit locations.
Figure 3. Excavation map of the Laurel Beach II Site.
Figure 4: STP J1 profile showing the shell midden deposit.

The Phase II Site Examination testing consisted of a single 1x1-meter square excavation unit that was divided into four 50 x 50-centimeter quadrants labeled by their cardinal direction. A coordinate system was established that held the southwest corner of the excavation unit as the site datum (N0E0). The unit was placed between STPs J1 and J1-S with the southwest quadrant of N0E0 abutting the north wall of J1-S. This excavation unit, as well as those in subsequent phases of excavation was dug in arbitrary 5-centimeter levels within the shell midden and 10-centimeter levels within natural soil strata. All soils were screened through 1/4-inch wire mesh. Plan view photographs were taken at various levels within the shell midden and of the interface between the midden and the B-horizon subsoil. A representative stratigraphic profile of each excavation unit was also photographed and drawn to scale. All artifacts were bagged by quadrant and level. Shell quantities and species composition were estimated for each level during
excavation. For a more precise quantification of the midden contents, a 9-liter soil sample was collected from the layer of dense shell for flotation analysis.

The Data Recovery Program employed two perpendicular 50-centimeter wide exploratory trenches to expose the boundaries of the shell midden within the drainage improvement APE. Once the shell midden boundaries were established an additional 1x1-meter excavation unit was excavated to further explore the contents of the midden. Fill overburden extending between 15 and 48 centimeters in depth was removed in the exploratory trenches to expose the interface between the fill and the top of the shell midden. Trench 1 was 4.5 meters in length and extended southward from STP J1-S. In this trench, the southern edge of the shell midden was observed approximately 3 meters south of J1-S. Trench 2 was placed at a perpendicular orientation to Trench 1, extending 2.5 meters westward toward the road along the S2 gird axis and into the fill berm associated with the road. The western edge of the shell midden was not encountered, as the midden was observed to extend under the fill berm. It is likely the shell midden extends under the road. The Phase III excavations determined the shell midden likely covers an area of approximately 13.5 square meters within the drainage improvement APE. The boundaries beyond the impacts of the project area were no established. A 1x1-meter excavation unit was placed in the area of what appeared to be the densest concentration of shell within the exploratory trenches. This was located at the intersection of the two trenches with the southwest corner of the unit placed at grid coordinates S2W0.5.

The supplementary fieldwork that was conducted over the winter and spring of 2017 – 2018 consisted of two additional 1x1-meter square excavation units which connected those excavated during the previous survey. This work resulted in four conjoined excavation units that
were placed on the shell midden. It is estimated that approximately 30% of the shell midden, as it existed with the drainage project APE, was excavated.

**Stratigraphy**

The general stratigraphy of the Laurel Beach II Site is comprised of a historic fill horizon that overlays a dense shell midden deposit, which sits atop natural B and C horizon soil profile. The overlaying fill deposit varies in thickness across the excavated portions of the site and generally became thicker as the excavations neared the roadway. A representative profile from excavation unit N0E0 is described here. Photographs of the individual unit profiles are provided as Figures 5-7. The top horizon was Fill 1 which extended to a depth range of 16-20 centimeters below surface (cmbs) and was comprised of very dark gray (10YR 3/1) fine sandy loam with traces of coarser sands and gravel and modern refuse. This stratum was followed by the shell midden deposit consisting of very dark brown (10YR 2/2) fine to medium sandy loam with dense marine-shell extending of maximum depth of 40-45 cmbs. The shell was most dense and notably less fragmented within the middle of the midden deposit, at a depth range of 30-35 cmbs (Figure 8). The dense shell was followed by heavily mottled interface of midden and B1 soils ranging from between 40-45 cmbs (Figure 9). The B1 horizon was comprised of brown (7.5YR 4/4) medium-to-fine silty loam with traces of coarser sands and a small amount of gravel. This horizon extended to an approximate depth of 68 cmbs where it faded into a thin B2 horizon consisting of dark yellowish brown (10YR 4/4) fine-to-medium silty sand with gravel and cobbles. The C horizon comprised of yellowish brown (10YR 5/4) sandy silt with coarse sand, gravel and angular rocks, was encountered at 76 cmbs. The excavation unit was terminated at 80 cmbs in the sterile C horizon.
Figure 5. N0E0 and S1E0 excavation unit profiles.

Figure 6. S1W1 excavation unit profiles. Note the modern post in the road berm fill in the west profile (right).
Figure 7. S2W0.5 excavation unit profiles.

Figure 8. Dense shell at 30 cmbs in S2W0.5.
Radiocarbon Dating

The stratigraphic units of the Laurel Beach II were dated by a series of three AMS radiocarbon dates (Table 1). Two of these dates were secured from organic materials within the shell midden matrix and one date was obtained from charcoal within the underlying B1 horizon. The initial AMS date was obtained to generally date the shell midden deposit. The locations of the subsequent samples submitted for radiocarbon analysis were strategically chosen to both assess the vertical stratigraphy of the site and to investigate the research questions associated with the chronological placement of Narrow Stemmed Tradition points. The initial AMS date was obtained from a hickory nut fragment that was recovered from the soil sample collected from the dense lens of shell in the northwest quadrant of N0E0 at a depth of 30-35 cmbs. The nut fragment returned a conventional radiocarbon age of 895+/-15 years BP with a calibrated range (2-sigma) of 905-742 BP (1045-1208 AD) (NOSAMS 44646). To obtain a radiocarbon age for the base of the shell midden deposit a hickory nut fragment from the shell midden/B1 interface in the southeast quadrant to S1E0 at a depth of 35-40 cmbs was submitted for analysis. This sample also served to date a quartz Lamoka-like point (Narrow Stemmed Tradition) that was also
recovered from this quadrant and depth. The hickory nut fragment from the shell midden/B1 interface returned a conventional radiocarbon date of 850+/−30 years BP with a calibrated range (2-sigma) of 898-690 BP (1052-1260 AD) (Beta 516861). These dates from the shell midden fall securely within the Late Woodland Period (1,000- 500 BP) and indicate that the midden was formed during this period. In order to obtain an age for the underlying strata, a fragment of hardwood charcoal that was recovered from the B1 horizon in the southwest quadrant of S1E0 at a depth of 50-60 cmbs was submitted for radiocarbon analysis. Again, this sample also served to date a quartz Lamoka point that was recovered from this quadrant and level. The charcoal fragment from the B1 horizon yielded a conventional radiocarbon date of 2110+/−30 BP with a calibrated range (2-sigma) of 2153-1995 BP (Beta 516852). This date falls within the final centuries of the Early Woodland Period and may represent the time of transition between the Early and Middle Woodland Periods.

### Table 1. Radiocarbon Dates from Laurel Beach II presented in years before present.

<table>
<thead>
<tr>
<th>Stratigraphic Unit</th>
<th>Prov.</th>
<th>Depth (cmbs)</th>
<th>Dated Material</th>
<th>Conventional Radiocarbon Age</th>
<th>Calibrated Age</th>
<th>Laboratory</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell Midden</td>
<td>N0E1</td>
<td>30-35</td>
<td>hickory nut</td>
<td>895 +/- 15</td>
<td>905-742</td>
<td>NOSAMS 44646</td>
<td>Late Woodland</td>
</tr>
<tr>
<td>Shell Midden/B1</td>
<td>S1E0</td>
<td>35-40</td>
<td>hickory nut</td>
<td>850 +/- 30</td>
<td>898-690</td>
<td>Beta 516851</td>
<td>Late Woodland</td>
</tr>
<tr>
<td>B1</td>
<td>S1E0</td>
<td>50-60</td>
<td>wood charcoal</td>
<td>2210 +/- 30</td>
<td>2153-1995</td>
<td>Beta 516852</td>
<td>Early Woodland</td>
</tr>
</tbody>
</table>

### Lithic Analysis

Analysis of the lithic assemblage from the Laurel Beach II Site was used to investigate changes in tool use and lithic raw material acquisition through time at the mouth of the Housatonic River during the Woodland Period. This analysis was also used to create a data set by with to make regional comparisons in order to address the general research questions of diachronic variability in lithic use, exchange networks, and sedentism that existed across coastal
southern New England during the Woodland Period. This analysis was also a critical step in addressing the issues surrounding the chronological placement Narrow Stemmed Tradition points and the quartz cobble “industry” associated with them, both at the Laurel Beach II and across the region.

**Lithic Analysis Methods**

Lithic analysis methods should be chosen based on the questions that are intended to be addressed. Approaching a lithic assemblage with multiple lines of investigation can serve as a means of checks and balances between the individual methods employed (Carr and Bradbury 2011: 315). Following this logic, multiple approaches which were designed to best address the proposed research questions were taken in the analysis of the lithic artifacts from Laurel Beach II. In order to adequately investigate changes in stone tool use and lithic raw material acquisition through time, the specific methods that are described below were applied separately to the sub-assemblages from within the shell midden matrix and those that were recovered in the soil below it. Based on the radiocarbon evidence presented above, the shell midden was a product of the Late Woodland occupation while the underlying strata date to earlier occupations of the site, namely the end of the Early Woodland Period. Temporally diagnostic ceramics and projectile points were used to confirm the additional presence of a Middle Woodland occupation represented in the underlying strata. Therefore to facilitate intra-site comparisons at Laurel Beach II, the Late Woodland shell midden sub-assemblage was contrasted against the underlying Early-Middle Woodland sub-assemblage. The shell midden sub-assemblage included artifacts that were recovered from the dense shell lens and the interface soils below the shell lens that contained more shell than other soil. This sub-assemblage also included the very few artifacts (n=18) that were recovered from the interface between the dense layer of shell and the
overlying fill. The sub-assemblage from the underlying strata included the mottled midden/B1 interface that included only a few or no shells, and the B horizons below it. The results between sub-assemblages were then compared to illuminate adjustments to and/or continuity in behaviors relating to stone tools at the site. The statistical significance of the differences between the various aspects of the two sub-assemblages was tested by employing “N-1” Chi-squared tests using MedCalc Statistical Software (2019 MedCalc Software).

In general, the lithic analysis was conducted as a scheme of narrowing scale. For all lithic artifacts the raw material type, color, and weight was recorded. Raw material types were first considered to make broad-scale comparisons between the sub-assemblages of the shell midden and the underlying soil horizons. The proportions of each raw material type were calculated based on the counts of individual materials (i.e. chert, quartz, basalt, etc.) which were divided by the total number of lithic artifacts recovered from the sub-assemblage. This analysis was critical to determining if meaningful changes in raw material use took place over the occupational history of Laurel Beach II.

Artifacts were subsequently divided into broad type-classes that consisted of flaked tool,debitage, debitage tool, cobble tool, core, or other lithic. The definitions of these terms largely follow Andrefsky (2005) and are provided here to avoid confusion of the various meanings that they may convey (Shea 2017: 20). Flaked tools refer to objective or detached pieces that were shaped by retouch, including bifaces, projectile points, and scrapers. Debitage was used to refer to detached pieces that are the product of knapping, including flakes and angular debris. Debitage tools are flakes that have been modified through use and/or retouch but are not shaped into formal tools. Cobble tool refers to unshaped cobbles including those used as hammerstones. Core was used to refer to objective pieces from which flakes have been detached and packages of
unmodified raw material. Other lithics was used to categorize all lithics that do not fit into the above categories, in this case in reference to items such as abraders or fire-cracked rock.

Flaked tools were categorized by type (e.g. biface, scraper, projectile point). The placement and type of edges, as well as general metric data (length, width, thickness, cross section etc.) was recorded for all flaked tools. Following popular archaeological nomenclature, bifaces that had refined blades and formal hafting elements were classified as projectile points. The blade attributes of edged tools, such as their overall shape, were examined to aid in the identification of their use. These analyses were of particular importance when comparing similar tool types between the sub-assemblages at Laurel Beach II. For example, artifacts that are classified as “projectile points” may have been made and used for a variety of non-projectile functions such as cutting, perforating, or engraving. This is especially true of Narrow Stemmed Tradition points, many of which functioned in ways other than tipping projectile armatures (e.g. Boudreau 2008; 2016). Furthermore, the variability in North American projectile points has allowed them to be used as fossil markers for pre-contact cultural time periods (Andrefsky 2005: 179). When possible, projectile points were assigned to a named-type, e.g. Fox Creek Lanceolate, by comparing their morphological features and metric attributes to published stone tool typologies (Boudreau 2016; Johnson and Mahlstet 1984; Justice 1987; Ritchie 1971). This step was important to facilitate the deciphering of the occupation chronology of the site.

Debitage was separated into classes of flakes and angular debris. Pieces with clear ventral and dorsal surfaces were considered flakes, while those whose ventral and dorsal surfaces could not be identified were classified as angular debris. Debitage was divided into five size-classes based on the maximum dimension of the artifact (Table 2). The size of debitage has been shown to relate to the size of the objective piece being worked and can be an indicator of the stage of
Since, stone tool production is a reductive process, as a tool nears completion (or its discard threshold) the debitage removed will become progressively smaller (Andrefsky 2005: 96). The amount of cortex can also indicate the stage of reduction and the general knapping strategy that was employed. Importantly, the type of cortex, such as that of smooth river cobbles or a bedrock outcropping can indicate if raw material was acquired from a primary or secondary source. Following Andrefsky (2005: 105-107), the type and amount of cortex was recorded using a nominal scale of less than 50%, approximately 50%, greater than 50% or 100% for all debitage size classes. This step was important in determining possible raw material sources and the types of tool making strategies that were associated with different lithic materials from Laurel Beach II.

### Table 2. Debitage Size Classes.

<table>
<thead>
<tr>
<th>Size Class</th>
<th>Maximum Dimension</th>
<th>Attributes Recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-5 mm</td>
<td>material; color; weight; platform; cortex</td>
</tr>
<tr>
<td>2</td>
<td>5-10 mm</td>
<td>material; color; weight; platform; cortex</td>
</tr>
<tr>
<td>3</td>
<td>10-20 mm</td>
<td>material; color; weight; platform; cortex</td>
</tr>
<tr>
<td>4</td>
<td>20-30 mm</td>
<td>material; color; weight; platform; cortex</td>
</tr>
<tr>
<td>5</td>
<td>&gt;30 mm</td>
<td>material; color; weight; platform; cortex</td>
</tr>
</tbody>
</table>

Flakes were separated into categories of being complete, proximal, distal, medial, or fragmented (Andrefsky 2005: 85-88). Complete flakes exhibited distinct dorsal and ventral surfaces, intact lateral margins, retained a striking platform and had a feathered or hinge termination. Proximal flakes retained a striking platform but terminated in a step. Distal flakes did not have a striking platform and terminated in a feathered or hinge termination. Medial flakes had intact lateral margins but contained stepped terminations at their proximal and distal ends. Flakes that were classified as fragmented did not exhibit clear proximal or distal ends, and typically had only one or no intact lateral margins. Flakes that contain the striking platform are the most important of these categories as they contain information about the objective piece from
which they were detached as well as the reduction sequence (Andrefsky 2005: 88; Scerri et al. 2016: 687). For example, flakes with cortical striking platforms represent an early stage in the reduction sequence, while those that are bifacial or abraded may be indicative of the final stages of production or the resharpening of a tool (Andrefsky 2005: 94-97). The type of all striking platforms regardless of the debitage size class was recorded as a means of determining the types of objective pieces, stages of the reduction sequence and general knapping behaviors at the site.

Cores were categorized by raw material and type (i.e. multidirectional, cobble). To quantify the level of reduction the number of possible removals and/or the extent of the periphery that was worked was recorded. If present, the amount and type of cortex was noted. The core analysis greatly strengthened the inferences into raw material procurement that were made through the debitage analysis and was an important part in determining if primary or secondary raw material sources were being used at Laurel Beach II.

Finally, the geographical sources of the lithic raw materials recovered from the Laurel Beach II Site were considered. Raw material sourcing has been used by archaeologists worldwide for inferences into group mobility (e.g. Adler et al. 2014), settlement patterns (e.g. Singer 2017), and regional connections (e.g. Luedtke 1987). This analysis was an important step in assessing diachronic changes in lithic procurement and the interpreted degrees of sedentism and/or territoriality at Laurel Beach II. Several methods were employed to ascertain potential sources of the raw material at the site. Following Schriever et al. (2011), the general vicinity of the site was explored to identify possible locations of raw material collection. In their study of the Mimbres Valley, New Mexico, Schriever et al. (2011) demonstrated that a simple reconnaissance survey of the area surrounding their study site assisted in distinguishing between local and exotically-sourced raw materials. Based on the results of the reconnaissance survey
around the Housatonic Estuary, raw materials that were thought to be exotic to the Laurel Beach II area were macroscopically compared to outcrop samples and published descriptions of regionally-available toolstone. Andrefsky (2005: 41) suggests that while macroscopic observations of the composition, texture, and structure of stone is helpful in identifying raw material sources, these approaches are subject to greater degrees of error than geochemical techniques. Therefore, following Frahm et al. (2014) and King et al. (1997), X-Ray florescence (XRF) was used as a confirming line of evidence to chemically verify the associations that were suggested by the macroscopic evaluations. In both of these studies the authors used XRF technology to detect the geochemical composition of lithic artifacts and successfully link them to specific sources.

**Lithic Analysis Results**

A total of 895 lithic artifacts were recovered during excavations at the Laurel Beach II Site. Artifact classes present at the site consisted of flaked tools, debitage, debitage tools, cobble tools, cores, ground stone, and other lithics (Table 3).

<table>
<thead>
<tr>
<th>Artifact Class</th>
<th>Whole Assemblage</th>
<th>Late Woodland</th>
<th>Early-Middle Woodland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage</td>
<td>Count</td>
</tr>
<tr>
<td>Cobble Tools</td>
<td>7</td>
<td>0.5%</td>
<td>5</td>
</tr>
<tr>
<td>Cores</td>
<td>8</td>
<td>0.25%</td>
<td>2</td>
</tr>
<tr>
<td>Debitage</td>
<td>832</td>
<td>93%</td>
<td>205</td>
</tr>
<tr>
<td>Debitage Tools</td>
<td>9</td>
<td>1%</td>
<td>3</td>
</tr>
<tr>
<td>Flaked Tools</td>
<td>25</td>
<td>3%</td>
<td>11</td>
</tr>
<tr>
<td>Ground Stone</td>
<td>3</td>
<td>0.25%</td>
<td>3</td>
</tr>
<tr>
<td>Other Lithics</td>
<td>11</td>
<td>2%</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>895</td>
<td>100%</td>
<td>232</td>
</tr>
</tbody>
</table>

**Raw Material Analysis Results**

In order of abundance the lithic raw materials present at Laurel Beach II included quartz, chert, granite, quartzite, basalt, schist, arkose, possible chlorite, gneiss, possible jasper, rhyolite,
shale and sandstone (Figure 10). There were also two artifacts of a lithic material that could not be identified. Since 98% of the artifacts were comprised of quartz and chert, the presented results of the lithic analysis were largely focused on artifacts made of these materials.

![Figure 10. Lithic raw Materials from the Laurel Beach II Site.](image)

In order to address diachronic changes in raw material acquisition and use at the Laurel Beach II Site, the proportions of raw materials within the Late Woodland and Early-Middle Woodland sub-assemblages were compared (Table 4).

<table>
<thead>
<tr>
<th>Raw Material</th>
<th>Late Woodland</th>
<th>Early-Middle Woodland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>Quartz</td>
<td>177</td>
<td>76%</td>
</tr>
<tr>
<td>Chert</td>
<td>38</td>
<td>17%</td>
</tr>
<tr>
<td>Other Materials</td>
<td>17</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100%</td>
</tr>
</tbody>
</table>
A total of 232 lithic artifacts were recovered from within the Late Woodland shell midden. The majority (76%) of these were comprised of quartz (n=177). The next most abundant (17%) raw material within the shell midden was chert (n=38). The remaining 7% of the shell midden assemblage consisted of minority materials that individually made up 1% or less of the sub-assemblage. These were comprised of arkose (n=2, 1%), basalt (n=3, 1%), gneiss (n=1, 0.5%), granite (n=2, 1%), hornfels (n=1, 0.5%), quartzite (n=2, 1%), rhyolite (n=1, 0.5%), schist (n=2, 1%), shale (n=1, 0.5%), and an unidentified lithic (n=2, 1%).

A total of 663 lithic artifacts were recovered from the Early-Middle Woodland component below the shell midden. These also consisted of an array of raw materials and were dominated by quartz (n=396, 60%) and chert (n=259, 39%). As in the Late Woodland shell midden, minority lithic materials comprised only one-percent 1% of this sub-assemblage. They consisted of granite (n=2, 0.3%), quartzite (n=2, 0.3%), possible chlorite (n=1, 0.1%), possible jasper (n=1, 0.1%), schist (n=1, 0.1%), and sandstone (n=1, 0.1%).

Since quartz and chert dominated both the Late Woodland and Early-Middle Woodland sub-assemblages, comparing the proportions of these materials was the most useful in assessing differences in raw material use between these time periods. Chi-squared tests showed there are highly significant differences in the proportions of chert \(X^2 (1, N = 895) = 37.41, p < 0.0001\) and quartz \(X^2 (1, N = 895) = 19.11, p < 0.0001\) between the Late Woodland shell midden and the site’s Early-Middle Woodland components. Essentially, these data demonstrate that there was a highly significant contrast in the amount of chert use through time at Laurel Beach II, whereas this material was much more prevalent during the earlier occupations of the site. It should also be noted that the majority (65%) of the chert recovered from the shell midden was from the lower levels (i.e. the Shell Midden/B1 interface soil) of the deposit. The chert at this
level may be the result of the mixing of this material that was already present on the ground surface as shell refuse was deposited. If this is the case, then the differences in raw material use between the Late Woodland and the earlier occupations would be even more pronounced.

Debitage Analysis Results

A total of 841 pieces of debitage were recovered from the Laurel Beach II Site. Ninety-nine percent (99%) of the debitage was comprised of quartz and chert, with the remaining 1% made up of arkose, hornfels, quartzite, shale and unidentified lithics. The debitage assemblage from the Late Woodland shell midden consisted of 208 artifacts, including three debitage tools. These consisted of quartz (n=166), chert (n=37), arkose (n=1), hornfels (n=1), quartzite (n=1), shale (n=1), and an unidentified lithic (n=1). The Early and Middle Woodland debitage assemblage was comprised of 633 pieces, including seven debitage tools. These consisted of quartz (n=375), chert (n=256) and quartzite (n=2). The focus of the debitage analysis was to determine if different knapping behaviors could be identified within the quartz and chert assemblages and if distinctions in these behaviors existed between the Late Woodland and the Early-Middle Woodland occupations.

Since the size of debitage generally gets smaller as flaked tools become nearer to completion or undergo resharpening, the debitage was first separated into size classes based on the maximum dimension of the artifact (Table 5).

Within the Late Woodland shell midden, all five size classes were represented. However, the majority of the debitage was between 10-20 millimeters in maximum dimension (Size Class 3) for both the chert (68%) and quartz (39%) collections. Microdebitage (Size Class 1) was better represented in the quartz assemblage (37%) than the chert (3%). Chi-squared tests demonstrate that significant statistical differences exists between chert and quartz artifacts in both Size Class
3 \( X^2 (1, N = 203) = 10.26, p = 0.0014 \) and Size Class 1 \( X^2 (1, N = 203) = 16.33, p = 0.001 \) debitage. Taken on their own, these data suggest that chert knapping activities during the Late Woodland were largely associated with intermediate stages of reduction while quartz knapping was more evenly distributed between intermediate reduction and the finishing and/or resharpening of tools.

<table>
<thead>
<tr>
<th>Size Class</th>
<th>Count</th>
<th>Percent</th>
<th>Count</th>
<th>Percent</th>
<th>Count</th>
<th>Percent</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>3%</td>
<td>61</td>
<td>37%</td>
<td>1</td>
<td>1%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>11%</td>
<td>15</td>
<td>9%</td>
<td>23</td>
<td>9%</td>
<td>72</td>
<td>19%</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>68%</td>
<td>65</td>
<td>39%</td>
<td>168</td>
<td>65%</td>
<td>227</td>
<td>60%</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>13%</td>
<td>18</td>
<td>11%</td>
<td>44</td>
<td>17%</td>
<td>59</td>
<td>16%</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>5%</td>
<td>7</td>
<td>4%</td>
<td>20</td>
<td>8%</td>
<td>17</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100%</td>
<td>166</td>
<td>100%</td>
<td>256</td>
<td>100%</td>
<td>375</td>
<td>100%</td>
</tr>
</tbody>
</table>

In the Early-Middle Woodland sub-assemblage, the majority of the debitage was classified as Size Class 3 in both the chert (65%) and quartz (60%) assemblages. The differences in the Late Woodland and Early-Middle Woodland assemblages between Size Class 3 debitage are negligible in regards to chert \( X^2 (1, N = 293) = 0.128, p = 0.7204 \), however they are highly significant between the quartz artifacts \( X^2 (1, N = 541) = 20.36, p < 0.0001 \). In further contrast to the Late Woodland, microdebitage (Size Class 1) was only represented by a single chert flake in the Early-Middle Woodland assemblage. The differences in quartz microdebitage between the Late Woodland and the earlier occupations are highly significant \( X^2 (1, N = 541) = 156.23, p < 0.0001 \). The results of the debitage size analysis suggest that less finishing and/or resharpening of quartz tools was occurring during the earlier occupations while there is a continuation in intermediate stage reduction associated with chert.
The debitage size analysis shows both continuity and change in knapping behaviors that are associated with quartz and chert between the Late Woodland and the earlier site occupations. However, size analysis can be the least reliable of the lithic analysis methods employed because it is dependent on the fracture qualities of individual objective pieces, some of which may be more prone to shatter and may not accurately represent changes in knapping behavior.

Striking platforms were analyzed to determine the types of objective pieces that were being worked and to better establish the stages of tool production that are represented by the debitage. A total of 425 pieces of debitage had striking platforms. This included 22 chert and 52 quartz pieces from the Late Woodland shell midden and 115 chert and 236 quartz pieces from the Early-Middle Woodland components (Table 6).

<table>
<thead>
<tr>
<th>Platform Type</th>
<th>Late Woodland</th>
<th>Early and Middle Woodland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chert</td>
<td>Quartz</td>
</tr>
<tr>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td>Abraded</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>Bifacial</td>
<td>7</td>
<td>32%</td>
</tr>
<tr>
<td>Broken</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>Cortical</td>
<td>0</td>
<td>0%</td>
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<tr>
<td>Faceted</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>Flat</td>
<td>6</td>
<td>27%</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>100%</td>
</tr>
</tbody>
</table>

The comparison of platform types between chert and quartz debitage revealed striking differences in the knapping strategies associated with these materials regardless of time period. Within the Late Woodland assemblage, the majority (68%) of the chert striking platforms were complex, while twenty-seven percent (27%) were flat, and none were cortical. Of the complex platforms thirty-two percent (32%) were bifacial, eighteen percent (18%) were faceted and eighteen percent (18%) were abraded. Complex platforms are indicative of later stages in tool
production and/or the rejuvenation of tools. Most importantly, complex striking platforms indicate that the objective piece being struck was an already formed tool, suggesting that most of the chert being knapped at Laurel Beach II arrived to the site in the form of already made bifaces. In contrast, the majority (60%) of the quartz striking platforms from the Late Woodland assemblage were flat and seventeen percent (17%) were cortical. Only nineteen percent (19%) of the quartz platforms were complex, all of which were bifacial. Chi-squared tests demonstrate that the proportional differences between complex, and flat or cortical platforms between the chert and quartz assemblages within the Late Woodland assemblage are highly statistically significant.

Similarly results were found in the Early-Middle Woodland sub-assemblage. In this collection, complex striking platforms (68%) dominate the chert debitage assemblage. While 24% of the chert platforms were flat and only 3% were cortical. All of the cortical chert platforms were made on veins of an unknown black mineral inclusion within the chert and do not represent true bedrock or cobble cortex. In contrast, only 18% of the quartz platforms were complex. The majority (68%) of the quartz platforms were flat and 13% were cortical, exhibiting smooth cobble cortex. Within the Early-Middle Woodland assemblage, chi-squared tests again show the proportional differences between complex and flat striking platforms on chert and quartz flakes are highly significant \([X^2 (1, N = 351) = 85.44, p < 0.0001]\). The differences between cortical platforms between chert and quartz pieces within this assemblage are also statistically significant \([X^2 (1, N = 351) = 8.78, p = 0.0030]\). However, because the cortical platforms on the chert debitage are related to mineral inclusions in the material and not true cortex, this does not weaken the argument that chert is being brought to the site in the form of partially reduced bifaces or blanks. Overall, the differences in striking platform attributes show
clear distinctions between the knapping strategies of chert and quartz artifacts at Laurel Beach II. The results of this analysis suggest that during both periods of occupation chert was being brought to the site as bifaces and flake blanks and that the primary reduction of cobbles and earlier stages of reduction were occurring with quartz.

Debitage cortex was also examined as a means of determining the stage of reduction and the types of objective pieces being worked at Laurel Beach II. Furthermore, the cortex analysis was an important method in establishing if raw materials were sourced from primary bedrock or secondary cobble sources. Answering this question was of vital importance in the investigation into changes in regional connections and inferred degrees of sedentism at Laurel Beach II. In addition, this analysis was essential in examining diachronic changes in the quartz cobble reduction process that is closely tied to the production of Narrow Stemmed Tradition points.

Stark differences in the amount and type of cortex existed between the overall chert and quartz assemblages from Laurel Beach II. None of the chert debitage from the Late Woodland sub-assemblage, and only a single piece (0.4%) from the Early-Middle Woodland assemblage exhibited cortex. This single chert flake had possible bedrock cortex or a weathered surface on less than 50% of its dorsal surface. In contrast, twenty-six percent (26%) of the entire quartz debitage assemblage from Laurel Beach II exhibited cortex, all of which was a smooth cobbles variety that is indicative of river or shoreline rocks.

Differences in the amount of cortical debitage within the quartz assemblage between time periods were negligible. In the Late Woodland assemblage 40 pieces of quartz debitage, or 24%, of the debitage assemblage contained cobbled cortex on their dorsal surfaces. The majority (47%) had cortex covering less than 50% of their dorsal surface however categories of 100% cortex (23% of the assemblage), greater than 50% cortex (20% of the assemblage) and 50% dorsal
cortex (10% of the assemblage) were all represented. These data indicate that various stages of the cobble decortication process occurred at the site during the Late Woodland.

Cortex analysis of the Early-Middle Woodland quartz assemblage yielded similar results. In this assemblage, 100 pieces of quartz debitage (27%) contained cobble cortex. Again the majority (41%) had cortex covering less than 50% of their dorsal surface and the categories of 100% cortex (17% of the assemblage), greater than 50% cortex (35% of the assemblage), and 50% dorsal cortex (7% of the assemblage) were all represented. Most importantly, a chi-squared test demonstrates that the proportions of quartz debitage containing cobble cortex are not statistically different between the Early-Middle Woodland and the Late Woodland assemblages \[X^2 (1, N = 841) = 0.727, p = 0.3939\]. The results of this analysis confirm a continuation of quartz cobble reduction throughout the Woodland Period at Laurel Beach II.

**Tool Analysis Results**

A total of 46 stone tools were recovered from the Laurel Beach II Site. These include eight projectile points, two point bases, two point tips, seven bifaces, two biface fragments, three endscrapers, one sidescraper, seven utilized flakes, one possible utilized flake, one retouched flake, three groundstone spalls, three hammerstones, two possible hammerstones, and two possible abraders. These tool categories will be individually discussed below for the Late Woodland and Early-Middle Woodland sub-assemblages to allow for a more straightforward comparison between the two. Twenty-two of the tools were recovered from within the Late Woodland shell midden and 24 were recovered from the underlying Early-Middle Woodland components.
**Projectile Points**

Projectile points were recovered from both the Late Woodland and Early-Middle Woodland sub-assemblages (Table 7). The points from component are discussed separately and the differences and similarities between the sub-assemblages are highlighted to illuminate diachronic continuity in point use and to provide evidence for the continued use of Narrow Stemmed points in the Late Woodland Period at Laurel Beach II.

<table>
<thead>
<tr>
<th>Inv. #</th>
<th>Soil</th>
<th>Depth (cmbs)</th>
<th>Raw Material</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>Shell Midden</td>
<td>20-30</td>
<td>Quartz</td>
<td>Untyped Narrow Stemmed</td>
</tr>
<tr>
<td>194</td>
<td>Shell Midden</td>
<td>30-38</td>
<td>Rhyolite</td>
<td>Cape Stemmed</td>
</tr>
<tr>
<td>239</td>
<td>Shell Midden/B1</td>
<td>38</td>
<td>Quartz</td>
<td>Untyped Narrow Stemmed</td>
</tr>
<tr>
<td>535</td>
<td>Shell Midden/B1</td>
<td>40-50</td>
<td>Quartz</td>
<td>Lamoka-like Narrow Stemmed</td>
</tr>
<tr>
<td>262</td>
<td>B1</td>
<td>40-50</td>
<td>Quartz</td>
<td>Untyped Narrow Stemmed</td>
</tr>
<tr>
<td>470</td>
<td>B1</td>
<td>50-60</td>
<td>Quartz</td>
<td>Squibnocket Stemmed (Narrow Stemmed)</td>
</tr>
<tr>
<td>549</td>
<td>B1</td>
<td>50-60</td>
<td>Quartz</td>
<td>Wading River (Narrow Stemmed)</td>
</tr>
<tr>
<td>589</td>
<td>B1</td>
<td>50-60</td>
<td>Quartz</td>
<td>Untyped Narrow Stemmed</td>
</tr>
<tr>
<td>591</td>
<td>B1</td>
<td>50-60</td>
<td>Quartz</td>
<td>Fox Creek Lanceolate</td>
</tr>
<tr>
<td>601</td>
<td>B2</td>
<td>70-80</td>
<td>Quartz</td>
<td>Untyped Narrow Stemmed</td>
</tr>
</tbody>
</table>

The Late Woodland shell midden contained three projectile points and one projectile point base (Figure 11). Based on their metric and morphological attributes, all of the projectile points and the point base from within the midden could be assigned to named traditions and/or specific types. A stemmed point made of rhyolite that was recovered from the dense layer of shell in N0E0 (Inv. #194 in Figure 11) which exhibited broad side notches and an expanding “knobbed” base was typed as a Cape Stemmed point (see Boudreau 2016: 113). This determination was made based on the overall morphology of the artifact and the high level of reworking that has resulted in a truncated working end, a defining characteristic of the Cape Stemmed type (Mahlstedt 1986a: 7). In general, Cape Stemmed points are equated with use as
knives, gravers, or scrapers. These functions are consistent with the stubby and somewhat asymmetric blade on the specimen from Laurel Beach II. The other two projectile points and the point base from within the shell midden typed as belonging to the Narrow Stemmed Tradition. These points were all made of quartz. One of the complete points was typed as a Lamoka-like point (Inv. #535 in Figure 11), while the other quartz point (Inv. #37 in Figure 11) was classified as an untyped Narrow Stemmed point. The point base (Inv. #239 in Figure 11) was too small to positively identify to a specific Narrow Stemmed type. The nearly complete untyped Narrow Stemmed point (Inv. #37 in Figure 11) is missing its tip and exhibits an asymmetric blade shape that resulted from an unbalanced resharpening of its lateral margins, suggesting use as a knife or cutting implement. The Lamoka-like point (Inv. #535 in Figure 11) exhibits a symmetrical blade and retains a portion of a flat striking platform on its base, as well as the curvature of the flake it was made on. This point was recovered from the same 50 x 50-centimeter unit quadrant and 5-centimeter excavation level as the hickory nut fragment that returned an uncalibrated radiocarbon date of 850 +/- 30 BP. Importantly, in contrast to other point styles, both Narrow Stemmed Tradition points and Cape Stemmed points are poor chronological markers, the former due to an extensive persistence in their use across cultural time periods, and the later due to their due to an extremely small number of these points that have been recovered from dated contexts. The presence of these point types within the dated context of the Late Woodland shell midden at Laurel Beach II is an important contribution to the archaeology of southern New England that will be detailed further in Chapter 5.
The Early-Middle Woodland assemblage from below the shell midden contained four complete projectile points and two point bases (Figure 12). The metric and morphological attributes of the projectile points from this sub-assemblage allowed them all to be assigned to named traditions and/or specific types. All of the points from the Early-Middle Woodland assemblage were made of quartz. Five of these points were assigned to the Narrow Stemmed Tradition while one was typed as a Fox Creek Lanceolate point (Inv. # 591 in Figure 12). A Middle Woodland component was confirmed by the presence of the Fox Creek point as this phase generally dates to 1,600 – 1,250 BP. This point is generally short for this type, indicating it has been reworked. The blade is slightly asymmetrical suggesting it may have functioned as a knife or cutting implement. This point also displays a slight “nipple tip” a common trait seen on
Fox Creek points that has been suggested as being the result of being used as drill (Boudreau 2016: 116). Two of the Narrow Stemmed Tradition points could be assigned to specific types while the other three could only be classified as untyped Narrow Stemmed points. Typed specimens included a Wading River (Inv. #549 in Figure 12) and a Squibnocket Stemmed point (Inv. #470 in Figure 12). The Wading River point has a symmetrical blade that suggests it may have functioned as a true projectile. This point was recovered from the same quadrant and level as the hardwood charcoal that returned an uncalibrated radiocarbon date of 2110 +/- 30 years BP. Like the dated Lamoka-like point (850 +/- 30 B.P) from the shell midden (Inv. #535 in Figure 11), the base of this point retains a flat striking platform and the curvature of the flake it was made on. Similarly, the Squibnocket Stemmed point from this sub-assemblage has a symmetrical blade and retains clear ventral and dorsal surfaces of the flake that it was made on. This point also exhibits a cortical base, confirming it was made from a quartz cobbble. Of the three untyped Narrow Stemmed points from below the midden, only one contained a full blade and could be considered a complete point (Inv. #262 in Figure 12). This point exhibits a rounded tip and an unbalanced blade that is the result of uneven resharpening and is consistent with use as a knife. The wear pattern on this artifact is very similar to one of the untyped Narrow Stemmed points (Inv. #37 in Figure 11) from the shell midden. The other two quartz points from this sub-assemblage are base and shoulder fragments that retained enough morphology to be accurately classified as Narrow Stemmed points. Both of these artifacts exhibit lateral snaps or bend-breaks that are consistent with snapping under pressure from use as a cutting implement (e.g. Rae and Jones 2017: 10).
This analysis demonstrates there is notable consistency in the use of points as knives or cutting implements, regardless of point type between the Late Woodland and Early-Middle Woodland sub-assemblages within the Laurel Beach II point collection. Continuity in the manufacturing techniques and wear patterns of the Narrow Stemmed points between these assemblages suggest that their persistence at Laurel Beach II may be related their function and/or the limited types of implements that can be produced from quartz cobbles.

**Bifaces**

Bifaces and biface fragments were also recovered from both sub-assemblages. Two complete biface and two biface fragments were found within the Late Woodland shell midden, all of which were made of quartz (Figure 13). One of the complete bifaces (Inv. #530 in Figure 13) and one biface fragment (Inv. #78 in Figure 13) appear to be the center of reduced quartz
cobbles, while the other biface fragment (Inv. #69 in Figure 13) is too small to make this determination. In contrast, a complete biface (Inv. #428 in Figure 13) retains a portion of a flat striking platform on its base, which is similar to the Lamoka-like point (Inv. #535 in Figure 11) also recovered from the midden. Furthermore, the tapering base of this biface as well as its plano-convex cross section and prominent medial ridge suggests it is likely a Narrow Stemmed preform. Similarly, unfinished Narrow Stemmed points from the Taunton River Basin were made on thick quartz flakes with the striking platform forming the base of the point (D. Ritchie 1981: 103). These data further compliments evidence from the debitage analysis and demonstrate that the quartz cobbled reduction method was used to produce Narrow Stemmed points during the Late Woodland occupation of Laurel Beach II.
Three complete bifaces and one biface fragment were also recovered from the Early-Middle Woodland component below the shell midden (Figure 14). Two of the complete bifaces were made of quartz and one of chert. One of the quartz bifaces (Inv. #295 in Figure 14) recovered from the B1 horizon appears to be the center of a quartz cobble and features the beginnings of a tapered rounded base that is suggest it is a preform of a Narrow Stemmed point. This artifact exhibits an isolated nodule that is surrounded by a cascade of step fractures that likely impeded the knappability of this tool and led to its discard prior to being made into a finished point. The other complete quartz biface (Inv. #596 in Figure 14) which was recovered from the B1/B2 horizon near the base of the excavation unit is a minimally retouched flake with a thick cortical platform at its base. This artifact may have been a flake knife or possibly a small triangle preform, although its small size and the thickness of the base would make further reduction difficult. The fragment (Inv. #52 in Figure 14) is the snapped tip of a large refined biface that exhibits an angled pointed tip with a lateral hinged bending break. The differential angle of the blade and the bending break suggest this tool was used as a knife. The red-brown chert biface (Inv. #547 in Figure 14) is made on 58 mm long flake and retains a thick flat platform its base and is missing its tip. This tool has been bifacially thinned and retouched along its lateral edges with fine bifacial and unifacial pressure flaking. The fine retouch and missing tip are consistent with manufacture intended for and used as a knife.

The biface assemblage from Laurel Beach II also shows continuity between time periods in tool manufacture techniques related to Narrow Stemmed tradition points. The results of this analysis further support evidence from the projectile point analysis that demonstrated the continued importance of cutting implements through time at Laurel Beach II.
Scrapers

Four endscrapers and one side scraper were recovered from Laurel Beach II (Figure 14). The Late Woodland shell midden contained one endscraper and one sidescraper, made of chert and quartz respectively. The dark-gray chert endscraper (Inv. #425 in Figure 15) appears to be made on irregularly flaked objective piece that may represent an exhausted core that was repurposed as a scraping tool. The scraping edge of this tool is step-fractured and appears to be battered which may be an indication that it was further recycled for use as a wedge. The excessive reuse of this tool demonstrates the importance of curating and recycling non-quartz toolstone, which may have become more important with the decreased abundance of chert during the Late Woodland occupation. The quartz sidescraper (Inv. #336 in Figure 15) is made on a
thick plano-convex flake and exhibits a unifacially retouched lateral margin. This scraper has a small area of smooth cortex on its dorsal surface indicating it was produced during quartz cobble reduction and likely represents a repurposed primary reduction flake.

![Figure 15. Scrapers from the Laurel Beach II Site. Inventory numbers 319, 321, 336, 425, and 537.1 (Left to right).](image)

Three endscrapers, one made of chert and two of quartz was also recovered from the earlier components below the shell midden. The red-brown chert endscraper (Inv. #321 in Figure 15) is made on a robust, 11 mm-thick flake that has been unifacially trimmed along its lateral margins in addition to the distal scraping edge. The working edge is heavily step fractured indicating that is made have been used to process harder materials such as bone or wood as opposed to scraping hides. The dorsal arrises on this scraper are polished, suggesting that it may have been used while secured in a haft and was resharpened to the point where the bit end barely
emerged from the handle. Similar to the sidescraper from the Late Woodland sub-assemblage, one of the quartz endscrapers (Inv. #319 in Figure 15) is made on a thick primary reduction flake featuring smooth cobble cortex. This artifact exhibits a steep unifacial retouch on what was the proximal end of the flake. The other quartz endscraper (Inv. #537.1 in Figure 15) is a small flake has been unifacially retouched along its proximal and lateral margin creating a steep scraping edge. This artifact is most consistent with a thumbnail scraper. This scraper also has a small area of smooth cobble cortex on its dorsal surfaces indicating it was produced through cobble reduction.

The presence of scrapers in both the Late Woodland and Early-Middle Woodland sub-assemblages indicates this tool type was important to site activities throughout the occupational history of Laurel Beach II. The results of this analysis also provide further evidence for quartz cobble reduction during both time periods. The highly curated nature of the chert scrapers from both occupations suggests that this material may have been valued more highly than quartz, likely due to differences in the availability of these materials.

**Debitage Tools**

Nine debitage tools were recovered from the Laurel Beach II Site, two from the Late Woodland shell midden and seven from the Early-Middle Woodland components below the midden (Figure 16). These tools provided insight into the degree of waste recycling related to quartz and chert materials and further highlighted the types of activities occurring at the site over time.
One retouched quartz flake and one utilized chert flake were recovered from within the Late Woodland shell midden. The quartz flake (Inv. #444 in Figure 16) exhibits a bifacially retouched distal end that is consistent with a flake-knife. The utilized red brown chert flake (Inv. #537 in Figure 16) is the proximal end of a flake that exhibits damage along a short cutting edge between its platform and a step fracture on its lateral margin. It is likely the step fracture resulted from use. Both of these artifacts represent expedient cutting tools.

Seven debitage tools were also recovered from the Early-Middle Woodland component below the shell midden. These consist of six utilized chert flakes and one possibly utilized quartz
flake. Five of the chert flakes (Inv. #s 480.2, 493, 506, 514, and 544 in Figure 16) all exhibit usewear along thicker and straighter portions of the flake or along the edges of stepped fractures. One of the chert flakes (Inv. #594 in Figure 16) has a 10-mm long, 2-mm deep concave edge along its distal end that is consistent with use a spokeshave. The quartz flake (Inv. #449 in Figure 16) is a generally L-shaped thinning flake with a possibly utilized distal end. As with the debitage tools from the shell midden, these tools represent the use of generally large pieces of debitage as expedient cutting tools.

The prevalence of chert over quartz in the overall debitage tool assemblage is notable and likely reflects a preference to make use of waste debris of this higher quality material. Similar to the chert scrapers, the greater use of chert debitage for expedient tools may reflect a higher value placed on this material over quartz, possibly related to difference in the availability of these materials.

**Core Analysis Results**

Cores were recovered from both sub-assemblages at the Laurel Beach II Site (Figure 16). While the cores are a compliment to the debitage analysis results that suggest the types of objective pieces that were being worked at Laurel Beach II, they provide direct evidence of the types of raw material packages being used at the site. The core analysis was a vital piece of the puzzle in determining if raw materials were acquired from primary or secondary sources.

Two cobble cores were recovered from the Late Woodland shell midden component. They consisted of a split quartz cobble (Inv. #430 in Figure 17) that had flakes removed from its ventral and dorsal surfaces and was more than 50% covered with smooth cobble cortex. An unmodified quartzite cobble that was also recovered from the shell midden matrix was classified as an unmodified piece of raw material. The presence of these cobbles supports the debitage
evidence that suggested quartz cobble reduction was taking place during the Late Woodland occupation of Laurel Beach II.

Figure 17. Cores from the Laurel Beach II Site. Inventory numbers 314, 430, 461, 502, 590, and 602 (Top to bottom and left to right).

Similarly, five quartz cobble cores and an unmodified cobble were also recovered from the Early-Middle Woodland component below the shell midden. In addition, a multidirectional red-brown chert core (Inv. #502 in Figure 17) was also recovered from these lower strata. The chert artifact has a maximum dimension of only 38-millimeters and exhibits three working faces, likely representing an exhausted piece of raw material. The five quartz cobbles cores (Inv. #461,
502, 586, 590, and 502 in Figure 17) have been bifacially and/or unifacially worked around half or more of their peripheries and retain portions of the original smooth cobble cortex. A complete quartz cobble (Inv. #314 in Figure 17) was also recovered from the B1 horizon below the midden and was classified as a piece of unmodified raw material.

The unmodified quartz cobbles recovered from both contexts were unquestionably brought to the site as they differ dramatically from the platy and angular schist bedrock that is the dominant naturally occurring stone within the soils at the site. The presence of these cores demonstrates that quartz cobble reduction strategies were used throughout the occupational history of the site. The exhausted chert core from below the shell midden further supports evidence from the debitage analysis that chert was brought to the site at intermediate stages of the reduction sequence and was likely acquired from a bedrock source.

Other Tools

The remaining tools and tool fragments recovered from Laurel Beach II include spalls of groundstone, possible abraders, and hammerstones. The groundstone fragments and all the hammerstones were recovered from within the Late Woodland shell midden. The groundstone spalls were all made of basalt and were from the southern half of excavation unit S1E0. These pieces are likely from the same object, although they could not be refit and were too small to determine the type of groundstone tool. The hammerstones from the shell midden included one granite and two schist cobbles that exhibited pitting or damage on east least one polar end. Additionally, a gneiss and a second granite cobble that exhibited inconclusive damage that were classified as possible hammerstones were also recovered from within the midden. All of the hammerstones were rounded river or shoreline cobbles. They are like related to the decortication process of quartz cobbles where they would be more effective than soft-hammer precursors.
Lithic Sourcing Analysis Results

The variety of the lithic raw materials recovered from the Laurel Beach II Site suggests the use of both local and non-local sources to acquire toolstone. As previously stated, the majority (98%) of the raw material at the site is comprised of quartz and chert, following by a smattering minority lithic types. Therefore, the lithic sourcing analysis was focused on determining potential sources for the quartz and chert recovered from the site. The debitage, stone tool, and core analysis all demonstrate that quartz materials were acquired from secondary cobble contexts while chert was brought to the site as intermediate stage bifaces or flake blanks, likely from primary bedrock sources. Since 95% of the chert assemblage was a distinctive red-brown color, the chert sourcing analysis was focused locating potential outcrops of this colored chert material. Similarly, since quartz was determined to be acquired in the form of cobbles, large concentrations of quartz cobbles were sought as potential sources of this material.

Following Schriever et al. (2011), the initial attempt to locate the potential sources of raw materials used at Laurel Beach II consisted of a reconnaissance exploration survey of the general site location. The survey covered the edges of the Housatonic River Estuary and shore of Long Island Sound, closest to the site, as well as the sand-spit, known as “Milford Point” at the mouth of the river, located approximately 1.25 km to the southwest. The survey revealed limited numbers of exposed quartz cobbles located along the riverbank and the beach immediately adjacent to the site. However, a several-hundred-meter long gravel lens was found on Milford Point that contained large numbers of quartz cobbles that were of comparable size and cortex quality to those recovered from the site (Figure 18). Matching similarities in the uninterrupted, smooth orangey cortex between cobbles on the Point and those from the site is an important observation in identifying this location as the probable source of the raw material form the site.
The presence of quartz cobbles alone does not necessarily equate with a raw material source. For instance, Boudreau (1981: 24-25) has demonstrated that while quartz is ubiquitously distributed across southern New England, not all quartz was created equal in terms of its knappability. In a survey of quartz-bearing gravel bars in southeastern Massachusetts he found differential distribution in quartz cobbles that were suitable for knapping. Notably, Boudreau observed the external quality of a cobble is a reflection of the quality of material inside, suggesting the most suitable quartz cobbles were those that were smoothly rounded with the cortex much like an orange rind. He further speculated that to a degree an experienced knapper could likely discern the flaking potential of a material at a glance without tediously testing every cobble (Boudreau 1981: 25). This may explain the two unmodified quartz cobbles that were recovered from Laurel Beach II. Together, this evidence strongly suggests that Milford Point was the likely area of procurement for the quartz found at Laurel Beach II. It is likely quartz cobbles were picked up on hunting and gathering trips in an around the mouth of Housatonic Estuary as ethnographic studies indicate that stone acquisition was commonly embedded in short-duration logistical forays within a few kilometers of a camp site (Kelly 1995: 130; Shea 2017: 13).

Figure 18. Gravel lens along Milford Point featuring numerous quartz cobbles.
The lithic reconnaissance survey also indicated that chert was not available in the vicinity of Laurel Beach II. The lack of cobble cortex on any of the red-brown chert artifacts also suggested acquisition from an outcrop rather than a secondary cobble source. Publications depicting regionally-available toolstone were consulted and an apparent match for the red-brown chert was identified as “Indian River Chert” which is part of the Normanskill Shale formation that outcrops in the Hudson Valley, New York (Brockman and Keegan 2016: 74-75; Wray 1948: 34-35). A sample of Indian River Chert from Kingston, New York provided by Connecticut State Archaeologist, Dr. Brian Jones, was macroscopically compared to the red-brown chert artifacts from Laurel Beach II. There was a strong agreement in the composition, texture, and coloring, between the two specimens, including the presence of seemingly diagnostic black inclusions of an unidentified mineral (Figure 19). Funk (2004: 133) also describes Normanskill chert as sometimes occurring as a red or red with black variety.

![Figure 19. Macroscopic comparison between a sample of Indian River Chert from Kingston, New York (left) and red-brown chert from Laurel Beach II (right).](image)
To geochemically test this macroscopic agreement, X-Ray Flocculence technology was used to record the chemical composition of the Indian River Chert sample and several of the red-brown chert artifacts from Laurel Beach II. The results demonstrated considerable similarities in the chemical composition of both materials, although they were not an exact match (Figure 20). These subtle differences may be accounted for by chemical variation within the source location, a common trait among rock types used for chipped stone tools (Andrefsky 2005: 41). However, the general agreement in the chemical composition of these materials strongly suggests they are from the same chert formation. The presence of a small number of artifacts at Laurel Beach II that are made from greenish-gray and dark-gray cherts, both of which are known to be associated with the Normanskill Formation, further supports the association of the red-brown chert with the Hudson Valley.

Figure 20. Spectra graph comparing geochemical composition of Indian River Chert sample with red-brown chert from Laurel Beach II.

The results from the lithic sourcing analysis from Laurel Beach II suggest that quartz cobbles were acquired within 1.25 kilometers of the site while chert was sources from over 100
kilometers away in the central Hudson Valley. These assertions are further supported by the difference in the discard threshold between quartz and chert artifacts that was apparent in the other stages of lithic analysis. For example, only one intermediate stage biface of chert was discarded while several quartz bifaces which could have been repurposed for cutting or scraping implements showed no signs of usewear. Furthermore, 80% of the debitage tools were made of chert suggesting a desire to make use of waste products of this material. These differences likely speak to the general value places on these raw materials which are probably related to the amount of investment in their acquisition.

The distinctions between chert and quartz at Laurel Beach II are important when considering diachronic changes to regional connections and the increase of sedentism and territoriality during later occupations of the site. The significantly higher proportions of chert material during the Early-Middle Woodland occupations of the site suggest that long distance communication or exchange networks existed during this time. These connections appear to have been greatly reduced or completely diminished during the Late Woodland occupations. In contrast, the use of locally-available quartz cobbles as a source of raw material was prevalent during both occupations. This was likely related to the ease of access to this material that could be acquired during regular foraging activities. However, the importance of quartz may have increased during the Late Woodland as access to higher-quality chert became more restricted.

**Lithic Analysis Conclusions**

Overall the results of the lithic analysis from Laurel Beach II demonstrate that the production of tools through quartz cobble reduction occurred throughout the occupation history of the site. This manufacturing technique is evidenced by the presence of unmodified and partially reduced quartz cobbles, as well as primary reduction debris, quartz bifaces, preforms,
and Narrow Stemmed Tradition points (Figure 21). This technology is focused on the reduction of fist-sized quartz cobbles into bifacial and less commonly unifacial tools (Bernstein and Lendardi 2007; Ritchie 1971b; Snow 1980). Reduction sequences related to this industry generally follow two trajectories, both of which are present at Laurel Beach II. In the first, the cobble serves as the objective piece from which a finished point is made. In the second, an initial decortication flake was removed from the end of a cobble to create a striking platform for which flake blanks were stuck off in “slices” (Ritchie 1981: 97-98). The importance of cutting and scraping implements and the use of Narrow Stemmed points as knives are also apparent throughout the occupational sequence of Laurel Beach II. These artifact types suggest that similar activities were occurring during the Early-Middle Woodland and Late Woodland occupations. Differences in the types of raw materials that were used and the significantly lower proportions of chert during the Late Woodland suggest that long distance connections with the Hudson Valley diminished through time. These changes may be related to the increased degree of sedentism and the development of more defined group territories that developed during the Late Woodland Period.
Ceramic Analysis

As a supplement to the lithic analysis from Laurel Beach II, a more concise analysis of the ceramic assemblage was conducted. The ceramic analysis was important in reaffirming the site chronology that was established by the radiocarbon and lithic evidence. The presence of ceramics can also be used to imply a degree of sedentism. The overall proportions of ceramics between the two sub-assemblages provided supporting evidence for the inferred changes in regional connections and increased territoriality through time that was demonstrated by the lithic analysis. Ceramic sherds were described placement on the vessel (i.e. body or rim), temper, surface treatment and decoration. When possible, sherds were assigned to the Early, Middle or Late Woodland Periods to aid in deciphering the occupational chronology of the site.

A total of 92 ceramic sherds were recovered from the Laurel Beach II Site. Ceramics were recovered from both the Late Woodland shell midden and the lower Early-Middle
Woodland sub-assemblages. In general the sherds were small in size, all were under 3-centimeters in maximum dimension, and did not contain diagnostic attributes. However, a few decorated pieces allowed for some chronological resolution to be illuminated from the ceramic assemblage. The majority (75%; n=69) of the ceramics were recovered from within the shell midden matrix (Figure 22). Twenty-three sherds (25%) were recovered from the strata below the shell midden (Figure 23).

![Figure 22. Representative ceramic sherds from the Late Woodland shell midden.](image)

Ceramics within the shell midden matrix consisted of 46 body sherds (66%), four rim sherds (6%), and 19 tiny fragments (28%) that were too small and/or lacked surfaces to allow their placement on the vessel to be determined. A variety of temper materials were included in the shell midden sub-assemblage although mineral grit was the dominant choice. Thirty-three sherds (48%) were tempered with fine grit, one (1%) was tempered with coarse grit, and one (1%) was curiously tempered with a mix of grit and shell tempering. Twenty-six of the sherds (38%) had no discernable temper, a common characteristic of Late Woodland Period ceramics.
Interestingly, considering that these sherds were recovered from a shell midden context implying an ample supply of raw material, only seven pieces of ceramic (10%) were tempered with shell, and six of these were small unidentifiable fragments. While the type of temper is not a secure temporal diagnostic, the differences in temper choices between the shell midden and the underlying strata at the least indicate that these sub-assemblages were comprised of different types of ceramic vessels.

Surface treatments in the shell midden sub-assemblage were also variable. Forty-six sherds (67%) had at least one smoothed surface. Many of these fragments were spalls and it was impossible to determine if the smoothed surface belonged to the interior or the exterior of the vessel. Two sherds were smoothed on both their interior and exterior surfaces. Five sherds had smoothed interiors and cord-marked exterior surfaces. Twelve sherds had smoothed exteriors and rough or brushed interior surfaces. Decorations were generally limited although five fine-grit-tempered sherds with rough or brushed interiors exhibited a banded linear dentate stamped decoration on their exteriors. One tiny spall also of fine-grit tempered ceramic exhibited similar decoration. While dentate stamped ceramics are sometimes considered a hallmark of the Middle Woodland Period, the technique is also found in styles of Late Woodland Sebonac Stage (circa AD 900-1500) and Niantic Stage (circa AD 1200-1650) pottery (Lavin 1986: 8-9; Lavin 1987: 32-33; Lavin 1998: 3-4).

All of the rim sherds (n=4) that were recovered from the shell midden had no discernable temper. Three rim sherds were from a vessel with a smoothed rounded lip. The forth rim sherd had a squared lip, smoothed interior and exterior surfaces and was decorated with cord-wrapped stick impressions along the lip surface. Cord-wrapped stick designs have been associated with
grit tempered varieties of the Late Woodland Sebonac Stage (Lavin 1987: 33; Lavin 2002: 160-161).

In general the attributes of the ceramic sherds within the shell midden assemblage were too few and sherds were too small to be able to definitively assign any of them to known types. However, the attributes of temper choice, surface treatment, and the few examples of decoration fit with other Late Woodland Period ceramics from coastal Connecticut.

Figure 23. Representative ceramic sherds from below the shell midden.

A total of 23 ceramic sherds were recovered from the mottled interface between the dark midden soil and the B1 horizon below the midden (see Figure 23). This sub-assemblage was comprised of 13 body sherds and 10 fragments that were either too small or lacked surfaces that allowed their vessel placement to be determined. In contrast to the Late Woodland assemblage the majority (61%; n=14) of these sherds, were tempered with coarse grit, while 22% (n=5) were tempered with fine grit and 17% (n=4) had no discernable temper. Surface treatments in this sub-assemblage were also variable. Nine of the sherds had at least one smoothed surface. One sherd
with fine grit temper was smoothed on both its interior and exterior surfaces. Three sherds had cord-marked exteriors, one with a rough interior, one with a smooth interior, and one spall that only retained the exterior surface of the vessel. Another of the coarse-grit tempered sherds tempered exhibited a smoothed interiors surface and a cord-impressed exterior. This sherd is possibly from the same vessel as four other coarse-grit tempered sherds recovered from the same quadrant and level, one of which had a smoothed interior and a cord-marked exterior. Lizee (1994: 77-82; Figure 18) equates exterior cord-marked vessels with cord-impressed decoration with post-1600 BP styles of the Windsor Cordmarked type. This type of ceramic became popular during the Middle Woodland period and persisted into the Late Woodland (Lizee 1994: 82; Lavin 2013: 148).

The ceramic data is consistent with the Late Woodland Period association of the shell midden that was based on the radiocarbon evidence. The possible association of the Middle to Late Woodland Windsor Cordmarked ceramic type with the interface between the shell midden and the subsoil horizons is in agreement with the lithic and radiocarbon evidence which demonstrate these lower strata are associated with an earlier occupation. However, while suggestive, the ceramic evidence is inconclusive as to assign an age to these lower strata. The presence of ceramics in both sub-assemblages indicates that their use was of some importance to food preparation. The increase in the number of ceramic sherds in the shell midden suggests they may have been of increased importance during this time. A Chi-squared test shows that the proportional differences between the number of ceramic sherds from the shell midden and the underlying strata are statistically significant \(X^2(1, N = 92) = 45.75, p < 0.0001\). However, these data are merely suggestive of the increased importance of ceramics during the Late Woodland
Period at Laurel Beach II because the fragmented nature and small size of the assemblage did not allow for definitive vessel lots to be established.

**Faunal and Botanical Analysis**

The faunal and botanical assemblages from the Laurel Beach II Site provide important information on the subsistence practices during the Woodland Period. Notably, the animal bones and botanical remains that were intermixed within the shell matrix indicate that the midden was likely a secondary refuse deposit, which may indicate it was created by a more sedentary population (e.g. Claassen 1991: 252). Due to preservation biases within the acidic soils of New England, a majority of these non-shell materials were recovered from the Late Woodland shell midden matrix. However, some faunal and botanical remains were preserved from the strata below the midden. At the time of this reporting a detailed analysis of large portions of the faunal and botanical materials has yet to be conducted. Nonetheless, the terse analysis of the shellfish remains as well as the presence or absence of terrestrial mammal, fish, and botanical remains, including those that have been identified to species provided useful information on subsistence practices that Native peoples occupying the Laurel Beach II Site were engaged in.

**Faunal Analysis Results**

The quantity and composition of the marine shells that made up the midden was estimated during field excavations and quantitatively sampled through soil sample collection. To provide a more precise analysis of the shell midden remains a 9-liter soil sample that was collected from the dense layer of shell between 30-35 cmbs in the northwest quadrant of N0E0. This sample was meticulously processed through flotation analysis and all recovered shell was quantified by species. Shell fragments exhibiting bivalve hinges were counted and the counts of the remaining fragments were estimated and exact weights were recorded by species. This
analysis revealed that by the number of hinges soft shell clam (*Mya arenaria*) was the most abundant species in the sample. Soft shell clam was represented by 520 hinges and an estimated 2,000 fragments weighing 760 grams. Eastern oyster (*Crassostrea virginica*) was the second most abundant species with 240 hinges and an estimated 2,100 fragments weighing 1,493 grams. This was followed by northern quahog (*Mercenaria mercenaria*) which had three hinges and 65 fragments weighing 50 grams. An additional estimated count of 14,500 shell fragments, weighing 2,284 grams that were too small for identification were also collected from the flotation sample. Assuming that shellfish were brought to the site whole, the flotation indicates that the remains of at least 260 soft shell clams, 120 eastern oysters, and 2 northern quahogs were discarded within this 9-liter volume of the shell midden matrix (Figure 24).

![Figure 24](image_url)

**Figure 24.** Representative composition of shellfish species based on the minimum number of individuals recovered from the 9-liter flotation sample.

The field notes suggest slightly different proportions of individual species but support the general large volume of marine shells within the midden matrix. Estimated shell counts during the Phase III excavation indicated that the shell midden within the S2W0.5 1-meter excavation unit contained 66,000 fragments of shell. Within this excavation unit, shell species
within the top 15 centimeters of the midden were estimated in the field to be 70% eastern oyster 
(*Crassostrea virginica*), 28% soft shell clam (*Mya arenaria*), and 2% other, mostly northern 
quahog (*Mercenaria mercenaria*), along with a few specimens of common Atlantic slipper shell 
(*Crepidula fornicata*) and unidentified gastropods. There was a noticeable increase in the 
number of whole bivalve halves in the vertical center of the midden deposit. The base of the 
midden consisted of approximately 98% eastern oyster, many of which were larger fragments 
and whole shells. The field notes suggest similar concentration of shell in other excavation units. 
For instance an estimated 34,900 shell fragments comprised of 74% eastern oyster, 24% soft 
shell calm, and 2% northern quahog were noted in S1E0 and approximately 54,200 shell 
fragments of similar species composition were recorded in S1W1.

Collectively, the shellfish data illustrate that marine shellfish were an important 
contribution to the diet of the Late Woodland residents at the Laurel Beach II Site. All of the 
species recovered or noted within the midden can be found in the mudflats or along the salt 
marsh peat of the Housatonic Estuary today and it is more than probable the shellfish comprising 
the midden were collected from this estuary during the Late Woodland Period.

A total of 591 non-shell faunal remains were also recovered during the excavations at the 
Laurel Beach II Site (Table 8). The majority (93%) of the non-shell remains included 548 bone 
and bone fragments that were recovered from within the shell midden matrix. The majority 
(55%) of this sub-assemblage (n=302) consisted of bone that was too small for identification. 
However, thirty-nine percent (39%) of the bones (n=214) were tentatively classified as 
unidentified mammal, although most of this assemblage has yet to be formally analyzed. Bones 
that were identified to species included a left mandible with the first, second, and third molars, 
three metapodial fragments, and one fragment of a first phalange of white tailed deer
Four other long bone shaft fragments were identified as likely white-tailed deer. The assemblage also included three unidentified bird bones and 21 fish bones, one of which was identified as and ultimate vertebrae from a fish within the flounder family (Pluerunectidae). This analysis indicates that both marine and terrestrial animals provided significant contributions to the diet of the Late Woodland residents of the Laurel Beach II Site.

Table 8. Non-shell faunal remains from Laurel Beach II.

<table>
<thead>
<tr>
<th>Faunal Type</th>
<th>Late Woodland</th>
<th></th>
<th>Early-Middle Woodland</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>white tailed deer</td>
<td>9</td>
<td>2%</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>unidentified mammal</td>
<td>214</td>
<td>39%</td>
<td>40</td>
<td>93%</td>
</tr>
<tr>
<td>unidentified</td>
<td>302</td>
<td>55%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>flounder</td>
<td>1</td>
<td>0.5%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>unidentified fish</td>
<td>21</td>
<td>3%</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>unidentified bird</td>
<td>3</td>
<td>0.5%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>total</td>
<td>548</td>
<td>100%</td>
<td>43</td>
<td>100%</td>
</tr>
</tbody>
</table>

A much smaller number (n=43) of bone and bone fragments were recovered from below the shell midden, although their composition was similar to that of the midden. The majority of these (93%) were tentatively classified as unidentified mammal. Two of the bones from below the shell midden were identified as probable white tailed deer (Odocoileus virginianus) and one as an unidentified fish. The sanctity of faunal remains from the Early-Middle Woodland assemblage is likely a result of preservation bias in the non-midden soil. However, the remains that were preserved in these lower strata demonstrate similarities in the dietary importance of terrestrial mammals like white tailed deer and marine fish with the Late Woodland occupation.

The preliminary analysis of the faunal remains from Laurel Beach II suggests that terrestrial mammals and fish were important aspects of the diet at the site even as shellfish became a more important contributor to the subsistence base during the Late Woodland Period.
**Botanical Analysis Results**

A total of 729 botanical specimens were recovered from the Laurel Beach II Site (Table 9). However, at the time of this reporting most of the botanical assemblage has yet to be formally analyzed. The majority (94%) of these remains were fragments of wood charcoal. Five-percent (5%) of the assemblage was comprised of charred nutshells and the remaining 1% was made up of a fragment of possible nutmeat and a single piece of uncharred wood.

**Table 9. Botanical remains from Laurel Beach II.**

<table>
<thead>
<tr>
<th>Botanical Type</th>
<th>Late Woodland</th>
<th></th>
<th>Early-Middle Woodland</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percentage</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>hickory nut</td>
<td>2</td>
<td>0.25%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>possible hickory nut</td>
<td>34</td>
<td>4%</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>unidentified nut</td>
<td>1</td>
<td>0.25%</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>unidentified nutmeat</td>
<td>1</td>
<td>0.25%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>wood charcoal</td>
<td>662</td>
<td>95%</td>
<td>26</td>
<td>87%</td>
</tr>
<tr>
<td>uncharred wood</td>
<td>1</td>
<td>0.25%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>699</strong></td>
<td><strong>100%</strong></td>
<td><strong>30</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

The majority (96%) of the botanical assemblage, consisting of 699 specimens, was recovered from within the Late Woodland shell midden matrix. This sub-assemblage is comprised of 662 fragments of wood charcoal (94%), 35 charred nutshells (5%), one possible nutmeat (0.5%), and one fragment of uncharred wood (0.5%). Of the 35 charred nutshells, two have been positively identified as hickory, 32 were tentatively classified as hickory based on their similarities to the positively identified specimens, and one was classified as an unidentified nut.

The remaining 4% of the botanicals, comprised of 30 specimens, was recovered from the Early-Middle Woodland sub-assemblage. This collection included 26 fragments of wood charcoal (87%) and four charred nutshells (13%). Of the charred nutshells three were tentatively classified as possible hickory based on similarities to the positively identified specimens in the
Late Woodland assemblage. One very small nutshell fragment was not able to be tentatively identified.

The succinct analysis of the botanical remains from the Laurel Beach II Site shows continuity in the use of hickory nuts between the Early-Middle Woodland and Late Woodland occupations of the site. The lack of domesticated cultigens recovered from the Late Woodland assemblage is notable and may be related to the fact that this occupation pre-dates the rapid dispersal of maize that occurs after 1300 AD.

**Faunal and Botanical Analysis Conclusions**

Collectively, the preliminary analysis of the faunal and botanical assemblages from the Laurel Beach II Site indicate that the residents of the site were engaged in diverse subsistence strategies focused on both marine and terrestrial resources. The data suggests continuity in the harvest of animals like white tailed deer, ocean fish, and tree nuts. While shellfish may have been exploited during earlier occupations, the creation of the shell midden deposit during the Late Woodland suggests a dramatic increase in the importance of this resource during this period.

**Discussion**

The overall assemblage analysis from the Laurel Beach II Site provides important information about Woodland Period settlement at the mouth of the Housatonic River. The distinct and dated Early-Middle and Late Woodland components at this site made it an ideal place to investigate diachronic changes in stone tool use, lithic exchange and regional connections, and the degrees of coastal sedentism. The presence of Narrow Stemmed Tradition points throughout the occupational sequence of site and the association of the poorly-dated Cape Stemmed point with the Late Woodland shell midden made this an important location to address
chronological issues regarding these artifact types. The results of the Laurel Beach II study also serve as a base from which to make regional comparisons to illuminate the degree of variability in lithic use, exchange networks, and sedentism that existed across coastal southern New England during the Woodland Period.

The analysis of the Laurel Beach II lithic assemblage revealed meaningful differences in the use of specific raw material types through time that imply changes in regional connections between the Early-Middle Woodland and the Late Woodland Periods. Comparing the number of chert artifacts between these sub-assemblages demonstrated a highly significant \( X^2 (1, N = 895) = 37.41, p < 0.0001 \) contrast in the amount of this material that was in use at the site over time. Chert artifacts were found to be much more prevalent during the earlier occupations, when they comprised 39% of the raw material assemblage, as opposed to just 17% of the smaller Late Woodland lithic collection. Lithic sourcing analysis concluded that the source of the chert was from over 100 kilometers away in the Normanskill Formation shale of the central Hudson Valley in New York State. This association was established based on the macroscopic comparison of hand specimens and XRF analysis. The respective lack of chert in the Late Woodland shell midden suggests the connections between the lower Housatonic and the Hudson Valleys had diminished by this period.

The likelihood the chert at Laurel Beach II was a trade item is suggested by the regional existence of extensive Early and Middle Woodland interaction spheres and trade networks that were reviewed in Chapter 2. Early Woodland interactions included vast west-to-east oriented networks associated with the Meadowood and Adena-influenced Middlesex complex, both of which included the exchange of exotic lithic materials. Exchange networks during the Middle Woodland shifted in orientation but still included the exchange of lithics from the New York-
New Jersey-Pennsylvania area. The presence of an Adena-related burial that exclusively featured exotic lithic materials located approximately 200 meters from the Laurel Beach II Site demonstrates that Early Woodland residents of the Housatonic Estuary participated in these long-distance exchange networks. However, the temporal resolution of the earlier assemblage from the site does not allow for the chert to be separately assigned to the Early or Middle Woodland occupation and it may be associated with either period. Nevertheless, the distinction in the amount of exotic lithics between the earlier occupations and the Late Woodland shell midden are far more meaningful for the investigation into changes in regional connections and territoriality than pinpointing if the chert was associated with the end of the Early Woodland or the beginning of the Middle Woodland Period.

The notion that chert was an exotic trade item is supported by the results of multiple aspects of the lithic analysis. The debitage analysis demonstrated that chert was brought to the site as bifaces, flake blanks, or nearly-finished tools. This was evidenced by the medium size of the majority of the chert flakes which suggested that knapping associated with this material was largely focused on intermediate stages of reduction. The prevalence of bifacial striking platforms indicated that the majority of the objective pieces made of chert were in the form of already made bifaces. Lastly, the lack of cortex, aside from one example of possible bedrock cortex, associated with the chert debitage further indicated this material was brought to the site in already reduced forms and hinted at a primary bedrock procurement source rather than the use of secondary cobble deposits.

The value placed on chert at Laurel Beach II is demonstrated by the sharp contrast in the discard threshold and the level of curation between chert and quartz artifacts. The differences in discard threshold between these materials are best exemplified by the core assemblage. Out of
the eight cores recovered from the site, only one completely exhausted core was made of chert. This is in contrast to several quartz cobble cores that had been minimally worked or were discarded as complete cobbles prior to being flaked. The value of chert is also seen in the level that chert scrapers were curated. The flaking and wear patterns on the dark gray chert scraper from the shell midden suggest that this artifact was an exhausted core that was repurposed as a scraper and then further recycled for use as a wedge. A similar level of curation was seen on the hafted chert endscraper from the earlier occupation which showed evidence that it was resharpened to the point that the bit end barely emerged from the haft. Finally, the fact that 80% of the debitage tools were comprised of chert reveals a tendency to use even the so-called waste products of this material. Together this evidence points to a desire to use the chert material to its full potential which implies there was significant cost in obtaining it.

While the lithic data from Laurel Beach II shows changes to regional connections that were inferred by the presence of Hudson Valley chert, the assemblage also demonstrates considerable continuity between the Early-Middle and Late Woodland occupations. The continuity in the use of quartz cobbles throughout the occupational sequence of the site may provide evidence for increased sedentism and territoriality during the Late Woodland Period and presents important data regarding chronological issues relating to Narrow Stemmed Tradition artifacts in southern New England.

The use of quartz cobbles as the primary source of raw material during the Late Woodland occupation at the Laurel Beach II Site may reflect increased sedentism and reduced territories, whereas groups were forced to increasingly exploit lithic materials that could be found within their homelands. The lithic sourcing analysis determined that the most likely source of the quartz at Laurel Beach II was a large gravel lens near the mouth of the estuary on Milford
Point, approximately 1.25 kilometers from the site. This gravel lens contained an abundance of quartz cobbles of similar size and quality to those recovered from the site. The long-term reliability of this raw material source is evidence by the similarities in the discard thresholds of quartz artifacts during both periods of occupation at the site. The recovery of discarded partially-reduced cobbles, large unused bifacial fragments, and primary reduction debris that were not recycled during both occupations suggests that quartz cobbles were a readily available and easily obtainable raw material.

The significant proportional increase \( X^2 (1, N = 895) = 19.11, p < 0.0001 \) in the amount of quartz in the Late Woodland assemblage indicates an escalated importance of this material. This increase and the persistence of the use of quartz cobbles into the Late Woodland may express a greater need to rely on locally-sourced toolstone in the face of reduced or now-absent connections to other raw material sources. When considering the evidence of Late Woodland territoriality that was reviewed in Chapter 3, it seems probable that this near-exclusive reliance on lower quality local toolstone may be a reflection of more constrained mobility during this time. For example, similar lithic evidence has been used to imply defined territories in eastern Massachusetts (Luedkte n.d.; Ritchie 2002) and coastal Rhode Island (Waller 2000) during the Late Woodland. Furthermore, models of “conditional sedentism” in Late Woodland southern New England depict territorial groups residing around a single estuary (Bragdon 1996; Dunford 2001). In this light, the importance of the source of the quartz cobbles being located within the Housatonic Estuary and within the inferred territory of the group that resided at Laurel Beach II during the Late Woodland cannot be understated.

The notion of increased sedentism and defined group territory during the Late Woodland occupation of Laurel Beach II is also supported by the ceramic and faunal assemblages from the
site. In general, ceramic technology is a characteristic of less-mobile populations. While the sample from Laurel Beach II is small, the greater number of ceramics that were recovered from the Late Woodland context may suggest more reliance on this technology and a more sedentary population occupying the site at this time. Additional evidence for Late Woodland sedentism at Laurel Beach II is found in the presence of the shell midden where the remains of thousands of marine shellfish were discarded. Furthermore, the fact that this deposit was intermixed with other food remains such as deer bones and hickory nuts, as well as broken ceramics and lithic debris suggests the midden served as a general secondary refuse deposit. These types of features are most likely to be associated with more-sedentary populations. Notably, the shellfish species and the fish remains present within the midden could have all been obtained from within the estuary. Moreover, the white tailed deer may have been hunted along its periphery or in adjacent uplands.

The seemingly dramatic intensification in shellfish collection during the Late Woodland Period at Laurel Beach II may reflect a need to exploit a more diverse resource base in response to constricted territory that was available for foraging activities.

The Laurel Beach II assemblage also provides relevant information regarding the chronology of point styles that are ambiguously dated in southern New England. The presence of a Cape Stemmed point within the shell midden at Laurel Beach II suggests including a Late Woodland age and an expanded geographical distribution for this point type. Evidence from Cape Cod and Long Island that will be detailed in the regional comparisons discussed in Chapter 5 show that these assertions regarding Cape Stemmed points are not unprecedented. Perhaps more importantly, the Laurel Beach II data also provides a Late Woodland age for Narrow Stemmed Tradition points and the quartz cobble reduction industry that is associated with them. The three Narrow Stemmed points and associated cobble reduction debris that were recovered
within the well-dated shell midden context from this site demonstrate that these tools were part of the Late Woodland toolkit at Laurel Beach II.

Multiple aspects of the lithic analysis document continuity in the use of cobbles to produce Narrow Stemmed points between the Early-Middle and Late Woodland occupations at the Laurel Beach II Site. It remains unclear, however, if the continued use of this tool type into the Late Woodland Period was related to the intended function of these tools or a restrained access to raw material sources and the limited types of implements that can be produced from quartz cobbles. Quartz cobbles reduction and the manufacturing and use of Narrow Stemmed points was well represented in both sub-assemblages at Laurel Beach II. The Early-Middle Woodland and Late Woodland assemblages each included unmodified quartz cobbles, partially reduced cobbles, primary and secondary debitage, quartz bifaces, and Narrow Stemmed preforms and points. Similarities in manufacturing techniques from each sub-assemblage is evidenced by Narrow Stemmed points that exhibit unmodified flat striking platforms on their bases and retain the curvature of the flake that they were made on. The prevalence for the use of Narrow Stemmed points as cutting or engraving implements is also evidenced by similar use patterns and blade morphology on points from both sub-assemblages. It seems probable that the continued use of these point types in the Late Woodland was related to both function and reduced access to raw material sources that was the result of the increasingly circumscribed territories of the period.

Overall the Laurel Beach II Site demonstrates use of the coastal environment of the Housatonic River Estuary during the Early, Middle, and Late Woodland Periods. Changes in the distribution of raw material types at this site suggest that regional connections between the Housatonic and the Hudson Valleys that were in place sometime during the Early-Middle
Woodland had diminished by the Late Woodland Period. However, the use of locally-available quartz cobbles as a source of raw material persisted throughout the occupation of the site. The changes in raw material acquisition and the near-exclusive use of local materials during the Late Woodland suggest increased sedentism and a more limited territorial range at this time. This notion is supported by the intensified inclusion of shellfish into the diet during the Late Woodland, as evidenced by the extensive shell midden that covers the site. Lastly, the Laurel Beach II assemblage provides convincing evidence for the inclusion of both Cape Stemmed and Narrow Stemmed Tradition points in the Late Woodland toolkit.
Chapter 5 Regional Comparisons

In this chapter the Laurel Beach II Site is compared with individual sites at are located in similar geographical settings and the general Woodland Period archaeological record from coastal southern New England (Figure 25).

![Map of regional comparisons](image)

**Figure 25. Areas and sites discussed in the regional comparison analysis.**

The Laurel Beach II site is first compared with other sites of similar age from the lower Housatonic River Valley, including three sites that were also located adjacent to the Housatonic estuary in Milford. The record form the lower Housatonic is then compared with data from the lower Connecticut River Valley, include the Old Lyme Shell Heap Site, located near the mouth of the river. Moving to the east, these data are then contrasted with a portion of the Woodland Period record form Narragansett Bay, namely from the Greenwich Cove Site. Lastly, the Laurel
Beach II Site and the general record from southern coastal New England thus far examine is compared with the data set from the outer arm of Cape Cod. Collectively, this comparative analysis situates the Laurel Beach II Site into the greater context of coastal southern New England and highlights similarities and variability in stone tool use, regional connectedness and lithic exchange, and trends toward sedentism and the use of coastal resources between the major drainages and geographic zones moving west to east across the region.

*Lower Housatonic River Valley*

The Laurel Beach II Site is first compared with sites within the same drainage system, mainly focusing on the lower portions of the Housatonic River. In general, the site corresponds well the current understanding of Woodland Period settlement patterns, stone tool use, and changes to regional connectivity in the Housatonic Valley. The data set from the Housatonic demonstrates a general trend toward increasing sedentism through the course of the Woodland Period, especially in the estuarine zone near the mouth of the river. This trend is evidenced at Laurel Beach II by the presence of the shell midden and the increased reliance on local lithic materials during the Late Woodland. Interregional connections were measured by the proportions of exotic lithic materials and mainly gauged by the proportions of Hudson Valley chert occurring in the Housatonic River assemblages. The proportions of Hudson Valley chert in the Housatonic assemblages suggest that groups in the two valleys were more connected during the Late/Terminal Archaic and Early/Middle Woodland than for the most of the Late Woodland Period. Importantly, for the research questions regarding the chronology of Narrow Stemmed Tradition points, the association of this tradition with the Late Woodland occupation of Laurel Beach II is supported by evidence of their persistence well into the Woodland Period elsewhere in the valley. The majority of the data used for the comparisons within the Lower Housatonic
River Valley was obtained from the 1989-1993 Iroquois Pipeline Project which non-biasedly identified and then excavated numerous sites throughout the valley (Cassedy 1992; 1998; Millis and Millis 2007).

The Early Woodland Period was generally underrepresented in the Iroquois Pipeline survey sample, both in terms of diagnostic artifacts and radiocarbon dates associated with this period (Cassedy 1998: 163-165, 176). The components identified from this period were generally small and remained scarce. However, this period was somewhat better represented in the lowest portions of the Housatonic Valley than elsewhere. For example, a small Early Woodland component was identified at the multicomponent Site 294A-17-1 (hereafter 17-1) located 300 meters east of the river and approximately 7 kilometers north of Laurel Beach II in Milford. The Early Woodland was represented by two Meadowood points made of Hudson Valley chert, along with two chert bifaces, a quartz biface fragment and a low-density scatter of chert flakes. In addition, a third stray Meadowood point also made of Hudson Valley chert was also recovered. Overall the Early Woodland component at 17-1 was interpreted as a small temporary campsite (Cassedy 1998: 203-204). An Early Woodland occupation was also present at the multicomponent Site 294A-AF2-1 (hereafter AF2-1), located 90 meters east of the river and approximately 9.5 kilometers north of Laurel Beach II in Milford. The Early Woodland component at this site was also small and consisted of two Meadowood points, one Rossville, one Adena point and interior cord-marked ceramics (Cassedy 1998: 203). While the presence of Meadowood and Adena points at Site AF2-1 demonstrates the occupants of the site were participating in the pan-regional interaction spheres of the Early Woodland Period, the fact that these artifacts were all made of locally available sandstone and diabase suggests they were locally-made copies rather than exotic trade items (Cassedy 1998: 203). The few Early
Woodland components represented in the Iroquois Pipeline survey suggest a settlement pattern consisting of small, short term campsites with a possible preference for use of the lower reaches of the valley. Furthermore, although the sample size for this period is relatively limited, the strong presence of Hudson Valley chert associated with the Early Woodland component at Site 17-1 indicates some connections between the Lower Housatonic and the Hudson valleys during this period.

The Middle Woodland Period is better represented in the Lower Housatonic Valley in terms of the occupation intensity. This was inferred by the number of ceramics and the amount and type of features that were associated with Middle Woodland components. This period was represented at all three multicomponent sites in Milford that were subjected to Phase III Data Recovery programs during the Iroquois Pipeline Project. A number of Clearview Stamped and Matinecock Stamped ceramics at AF2-1 that represent a minimum of seven vessels suggests that seasonal aggregation increased during the early Middle Woodland Period at this site (Cassedy 1998: 204). Interestingly, no projectile points that are traditionally considered to be diagnostic of the Middle Woodland were recovered during excavations at AF2-1, although nearby surface collections produced a number of Fox Creek Phase points (Cassedy 1998: 146). Similarly, numerous sherds of brushed ceramics assigned to the late Middle Woodland or early Late Woodland Period were recovered from Site 17-1. Again few point styles were recovered during the excavations but a review of Coffin’s collections from the nearby Baldwin’s Station Site indicated a more substantial Middle Woodland presence (Cassedy 1998: 153). Finally, the Middle Woodland was also represented at Site 294A-25-2 (hereafter 25-2), located adjacent to the Housatonic River approximately 9 kilometers north of Laurel Beach II in Milford. This occupation was represented by numerous sherds of Clearview-stamped ceramics and three
storage/refuse pits that were radiocarbon dated to between 1950 +/- 70 BP and 1760 +/- 70 BP. These dated features confirm a Middle Woodland date for the Clearview ceramics are indicative of a longer-term occupation (Cassedy 1998: 149-150, 166). A coastally-focused subsistence economy was evidenced by large quantities of shellfish, mainly consisting of soft shell clam with a moderate number of oysters and only a few quahogs. Based on the distribution of known shellfish processing sites in the area, it was hypothesized that Site 25-2 was located at the approximate northern limits of shellfish beds within the lower Housatonic River (Cassedy 1998: 151). A refuse pit containing numerous shell that was radiocarbon dated to 1920 +/- 80 years BP suggest the emphasis on shellfish processing at 25-2 probably started during the Middle Woodland (Millis and Millis 2007: 94). Overall it appears that the occupations of the Lower Housatonic River Valley became more intense during the Middle Woodland Period suggesting an increased trend toward sedentism in coastal/riverine locations. This trend toward coastal preference is supported by the fact that the early Middle Woodland component at Site 270A-4-1 (hereafter 4-1) which is located near an upland wetland in Newtown, Connecticut is small while more substantial Middle Woodland components were found on the Housatonic floodplain in Milford (Cassedy 1998: 206).

The late Middle Woodland and Late Woodland Period (circa 1250-350 B.P) were combined and described as the “Later Woodland” in reporting of the Connecticut portion of the Iroquois pipeline survey. This distinction was based on McBride’s (1984) combining these periods into the Selden Creek Phase in the Lower Connecticut River Valley. This classification proved decidedly useful in comparing these two river valleys in the following subsection of this chapter. A clear preference for the coastal zone during the Later Woodland was demonstrated in site distribution in the Iroquois Pipeline data. In general, sites dating to the late Middle to Late
Woodland were uncommon in the upper reaches of the valley north of the upland swamps along Cavanaugh brook in Newtown, Connecticut. Two sites in this area, 270A-2-1 and 270A-4-1, had only modest occupations dating to the Later Woodland. In contrast, there was abundant evidence for substantial, intensive occupations during these periods found at sites AF2-1 and 25-2 on the floodplain in Milford (Cassedy 1998: 216). In combination, these two sites produced 18 features that dated to the Late Woodland but interestingly only two triangular projectile points were recovered (Cassedy 1998: 218). Twenty-two Narrow Stemmed points were recovered from AF2-1 and two were recovered from 25-2, however because Late Archaic points were present at both of these sites the Narrow Stemmed points cannot be definitively associated with the Woodland Period (Cassedy 1998: 141, 147). Maize was recovered in 13 features between these two sites, demonstrating that domesticated cultigens had been incorporated to the diet in the lower Housatonic Valley during the Late Woodland. Radiocarbon dates from features with maize at 25-2 calibrated to AD 1277, 1401, and 1657, and those at AF2-1 calibrate to AD 1442-1445. Although the quantities of maize were small their ubiquity in the features, especially at AF2-1 indicate maize was an important part of the diet in the lower Housatonic valley by the latter-half of the Late Woodland (Cassedy 1998: 219).

While maize was not present at the Laurel Beach II Site, there were other similarities with the Late Woodland components in the Lower Housatonic Valley. For instance, ceramics represented at AF2-1 were relatively similar to the small assemblage form Laurel Beach II. These included Windsor Brushed, Sebonac Stamped, and Hollister Plain vessels, as well as untyped cord-wrapped stick stamped vessels that were associated with the Late Woodland component at AF2-1 (Cassedy 1998: 144). Interestingly large shell middens were absent from AF2-1, although shell was recovered from some of the refuse pit features. The absence of large
middens may be related to the use of AF2-1 as a base camp while other sites such as 25-2 were more closely related to shellfish processing (Cassedy 1998: 151). Numerous shell midden features were identified during excavations at 25-2, along with refuse and storage pits. These features indicate that while shellfish processing appears to be the main activity at 25-2, longer duration occupations were occurring by the Late Woodland Period. Similar to the midden at Laurel Beach II, soft clam was present in higher frequency than other shellfish species at 25-2, followed by oyster and only a few individuals of quahog (Cassedy 1998: 151). Softs shell clam represented 733 of 916 individual shellfish animals (Millis and Millis 2007: 93). The contents of these shell middens indicated that residents were engaged in a diverse subsistence economy that included marine and terrestrial prey items. Non-shellfish prey items that were recovered from the midden included white tailed deer, red fox, and eastern chipmunk, herring, and finfish of the class \textit{Osteichyes}. The gathering of plant foods was evidenced by the presence of nutshell including hickory, acorn, and butternut (Cassedy 1998: 151). Hickory was the dominate nut type consistently recovered from features, with acorn and butternut recovered in smaller quantities (Millis and Millis 2007: 92). Hickory nuts also dominated the Late Woodland nutshell assemblage at Laurel Beach II. Semi-permanent Late Woodland occupation at 25-2 was further evidenced by maize recovered from six features with radiocarbon dates of AD 1240, AD 1390 and AD 1720. As with the data from AF2-1 and AF2-2, these data indicate that maize was incorporated into the subsistence economy by the 13\textsuperscript{th} century an kernel and cob suggest maize was grown at or nearby the site (Millis and Millis 2007: 93). Overall both 25-2 and AF2-1 demonstrate the trend toward increased aggregation and sedentism in the coastal/riverine zone over the course of the Woodland Period, and 25-2 supports that occupation of this zone had become semi-permanent by the Late Woodland. For instance the occupational sequence of AF2-
1 suggests that the site was used as a seasonal base camp during the Terminal Archaic Orient Phase and was more heavily occupied during seasonal aggregations in the Middle Woodland, and likely became a semi-permanent habitation in the Late Woodland Period (Millis and Millis 2007: 89).

Using lithic sourcing data from the Iroquois Pipeline Project, connections between the Hudson and the Housatonic River valleys was extensively studied by Cassedy (1992; 1998). These data provide both insights into diachronic changes in the degree of connectedness between these two valleys and suggest a likely cultural divide between the upper and lower portions of the Housatonic Valley. The distribution of Hudson Valley chert drops considerably at the Hudson/Housatonic drainage divide during all time periods. However, in the upper reaches of the Housatonic sites typically had assemblages with chert percentages that comprised 40-60% of raw material, while those in the lower valley (Newtown to Milford) consistently had assemblages comprised of less than 20% chert, and even lower in many cases (Cassedy 1998: 228). Comparisons that were based on raw material weight shows that as chert moved away from the source areas in the Hudson Valley it was quickly reduced in size (Cassedy 1992: 207). This pattern matches the chert assemblage at Laurel Beach II which demonstrated that chert was brought to the site in the form of partially reduced bifaces or flake blanks. The divide in lithic proportions is mirrored in the ceramic assemblages, which indicates some kind of cultural divide between the upper and lower portions of the valley where communities in the upper valley were more similar to those in the Hudson Valley and had greater access to Hudson Valley chert. It was suggested that the division between the upper and lower segments of the Housatonic derives at least in part form a greater reliance on semi-sedentary, horticultural settlement in the lower
Housatonic and the resultant need for more explicitly defined cultural boundaries in such a system (Cassedy 1998: 228).

Cassedy (1992: 218-227) also examined diachronic changes in chert use between the Hudson and Housatonic valleys and the sub-drainages within them by various methods including artifact counts, material weight, point styles, and the presence of chert in radiocarbon-dated features, with differing results. Due to the limited number of diagnostic Woodland Period projectile points and the multicomponent nature of most of the sites in the lower Housatonic Valley it seems most appropriate to examine the changes in chert use through time by using radiocarbon-dated features as the proxy for time period. While this limits the sample size of the amount of chert that can be included in the analysis, it allows for the absolute association with this lithic material and a specific time period. Using dated features as a proxy Cassedy (1992: 225-226) found that the percentages of chert (by count) in the lower Housatonic rose from an all-time low of 1% during the Late Archaic to comprising 6% of assemblages during the Early Woodland/early Middle Woodland Periods and a peak of 17% in a lone Middle Woodland feature dated to 1450 BP. The amount of chert then dropped to 2% during the Late Woodland and again climbed to include an average of 8% assemblages at the end of the Late Woodland Period. By weight these same data show a low of near 0% during the Late Archaic, a peak of 14% during the Middle Woodland and a drop to near 0% during the Late Woodland. The amount of chert climbed to a mere 2% by the end of that period. While the proportions of chert are considerably higher during all of the Woodland occupations at Laurel Beach II, the same general trend of chert being a more common raw material during the Early-Middle Woodland occupations and dropping considerably during the Late Woodland is mimicked. The higher percentages of chert at Laurel Beach II could be related to the fact that out of the sites examined
Laurel Beach II is the closest to the mouth of the river. If chert was moved from source areas in the Hudson Valley by water and through Long Island Sound rather than a northern route through the Fishkill and Ten Mile River drainages than it would have reached the Laurel Beach II area first. Regardless of the route of transport, these data collectively suggest a general decline in the connections between the Hudson and Housatonic Valleys throughout the Woodland Period that appears to be related to increased sedentism and territoriality.

What is perhaps most interesting about the assemblages from the lower Housatonic River Valley is the low frequencies of Woodland Period projectile points relative to the number of components that were identified. This trend was especially apparent in regards to Early and Middle Woodland point types such as Meadowood, Rossville, Adena, Fox Creek and Jack’s Reef. While, the low frequency of Early Woodland points can be explained by the lack of radiocarbon dates from this time period, the same cannot be said for the Middle Woodland, where numerous sites produced radiocarbon dates and ceramics associated with this period. This trend led Cassedy (1998: 176-177) to hypothesize that quartz Narrow Stemmed points were likely the “everyday” point choice of the Early and Middle Woodland populations in the Housatonic drainage. Unfortunately, since the sites were not stratified most of the associations with the Narrow Stemmed Tradition and the Early and Middle Woodland Periods are suggestive rather than definitive (Cassedy 1998: 175).

A review of the data from the pipeline survey provides several examples of the suspected use of Narrow Stemmed points during the Early and Middle Woodland in the Housatonic Valley and is also suggestive of these points being in use during the Late Woodland. For instance, considering the large Woodland component demonstrated by the ceramic collection and the number of dated features at AF2-1, Woodland Period points are represented only in abnormally
small frequencies compared to the Late Archaic and Terminal Archaic sample at that site. It seems likely that the lack of diagnostic Woodland points at AF2-1 is the result of a continued use of Narrow Stemmed tradition artifacts (Millis and Millis 2007: 89). A similar notion of the continued use of Narrow Stemmed points was suggested at 25-2. This was based on the fact that all of the features either produced radiocarbon dates assigned to the Middle Woodland Period or later, or contained ceramic fragments. However, the presence of a Brewerton point and two possible Stark points from this site makes the association of the Narrow Stemmed points with the Woodland occupations inconclusive. Although the projectile point and ceramic assemblages, as well as the number of radiocarbon-dated features indicate that the main occupations occurred from the Middle Woodland through the Late Woodland and historic periods (Cassedy 1998: 149). Finally, an excavation block at 4-1 in Newtown that contained ceramics and a dated Middle Woodland locus contained eight Narrow Stemmed Points, but due to vertical mixing the degree of association could not be clarified (Cassedy 1998: 175-176). Millis and Millis (2007: 84) also suggested the persistence of Narrow Stemmed points at 4-1 because no typical Early and Middle Woodland points were found at the site despite the ceramic and radiocarbon-dated features that support occupations from these periods. However, a quartz workshop with several Narrow Stemmed type points from 4-1 was near a feature dated to 3740 BP. However, based on the overall patterns seen throughout the valley, this association was considered to be insufficient to disprove the regional evidence that Narrow Stemmed points were used in the Woodland period as well (Cassedy 1998: 175). While the Late Woodland not highlighted in the discussions regarding the use of Narrow Stemmed points during the Woodland, the lack Levanna points at the two most intensively occupied Late Woodland sites in Milford is noteworthy. Furthermore, the general curiously low frequency of Levanna points in the Housatonic drainage, relative to
both other point styles, as well as the number of Levanna points recovered from the Hudson valley suggests other point forms may have been in use during the Late Woodland. Collectively, these data establish a precedent and support the association of Narrow Stemmed points with all the Woodland Period occupations at the Laurel Beach II Site.

**Lower Connecticut River Valley**

The record of the Woodland Period in the Lower Connecticut River Valley draws interesting parallels with the Laurel Beach II Site and the overall data set from the Lower Housatonic Valley. The Old Lyme Shell Heap site bears interesting similarities to Laurel Beach II, particularly in regards to the association of Narrow Stemmed points and the Late Woodland Period. The overall record from the Lower Connecticut demonstrates that while these similarities exist there is also variability between these valleys. The differences are particularly apparent in terms of regional connections that were inferred by the presence of exotic lithic materials and the types of stone projectile points used during the Late Woodland Period. The Laurel Beach II Site was first individually compared with the reanalysis of the Old Lyme Shell Heap site that conducted by Lavin (1992) and then the extensive work done in the lower valley by McBride (1984).

The Old Lyme Shell Heap is located on Griswold Point at the mouth of the Connecticut River in Old Lyme, Connecticut. The midden at Old Lyme runs along the coast for 800 feet, ranging in width between 8 and 100 feet, and in thickness from a few inches to three feet (Lavin 1991: 69-70). The site contains Terminal Archaic Orient phase and Late Woodland Sebonac phase components which were often horizontally, although not always vertically distinct (Lavin 1991: 71). However, the distinctions were sufficient enough for Lavin (1991) to identify four Late Woodland and two Terminal Archaic activity areas from which to make her diachronic
analysis of the site. The remainder of the materials were classified as mixed/unknown and was not included in the comparative analysis. Lavin found that Narrow Stemmed point forms, mainly Wading River and Squibnocket Stemmed points were found throughout both the Orient and Sebonac occupations (Lavin 1991: 71). Interestingly, of the 62 projectile points assigned to the Late Woodland component, only three were classified as the typical Levanna or Jack’s Reef points that are used to distinguish the Late Woodland Period. The majority (81%) of these points were associated with Narrow Stemmed Tradition types (Lavin 1991: 73 Table 2). All of the Late Woodland activity areas included split cobbles and debitage. Three of these areas also included Narrow Stemmed points suggesting that quartz cobbles reduction and the manufacture and/or use of Narrow Stemmed points was a prevalent activity at the Old Lyme Shell Heap during the Late Woodland occupation. It is of note that the only Late Woodland activity area from Old Lyme that did not include Narrow Stemmed points had only one point which was made of bone and was associated with a burial. The presence of the full cobbled reduction sequence in the Late Woodland component of this site parallels the evidence of quartz cobbles reduction being the primary technological during the Late Woodland occupation at Laurel Beach II. The most convincing evidence of the use of Narrow Stemmed points during the Late Woodland at the Shell Heap is that there was Wading River points and Sebonac phase pottery were included with the burial of an adult male (Lavin 1991: 77-80). One of the two Terminal Archaic activity areas at the Shell Heap also contained evidence of manufacturing bifaces from quartz cobbles and the association of an Orient Fishtail point with a Squibnocket Stemmed and an untyped Narrow Stemmed Point (Lavin 1991: 81-82). Like at Laurel Beach II, this association shows continuity in the use of Narrow Stemmed points through time.
In addition to the presence of quartz cobble reduction, the overall assemblage make-up of the Late Woodland occupation at the Old Lyme Shell Heap draws parallels to the Late Woodland component at Laurel Beach II. General activities associated with processing animal remains such as butchering and hideworking are present at both sites. Like at Laurel Beach II the Late Woodland activity areas at Old Lyme contained scrapers, knives, and flake knives. Site activities at Old Lyme include shellfish and other food resource processing including that of white tailed deer, birds, and turtles. The primary activities at the site were shellfish processing, tool manufacture from local beach cobbles, and butchering/cooking of daily means. Bone manufacturing and hideworking were also major activities. Fishing, weaving, and mortuary practice played a minor role in the overall site activities (Lavin 1991: 80). These appear to be the same types of activities that occurred during the Late Woodland occupation at Laurel Beach II.

While numerous similarities were demonstrated between the Laurel Beach II Site and the Old Lyme Shell Heap, comparison with the greater Lower Connecticut River Valley shows there is more variability than suggested by these two assemblages. The large-scale settlement and assemblage data for the Lower Connecticut River Valley compiled by McBride (1984) demonstrates both conformity and variability between the Laurel Beach II Site and with the Lower Housatonic and the Lower Connecticut River valleys in general.

The Early Woodland Period in the Lower Connecticut River Valley is represented by the Broeder Point Phase (McBride 1984: 129). This phase dates to between 2700 and 2000 BP and is characterized by a continuation of the Late Archaic quartz cobble lithic industry that was used to produce Narrow Stemmed Tradition points with the addition of Meadowood, Lagoon, and Rossville point types. The phase also includes the presence of thick, grit-tempered ceramics with cord-marked interiors and either cord-marked or smoothed exterior surfaces. Laurel Beach II and
the Lower Housatonic are similar to the Lower Connecticut River Valley in the continuation of the quartz cobble industry and the use of Narrow Stemmed Points form the Late Archaic. However, the two valleys contrast during this period in patterns of lithic sourcing. The Housatonic exhibits a moderate reliance on exotic chert obtained from the Hudson Valley, while populations in the Lower Connecticut River Valley were almost exclusively using local quartz cobbles for lithic raw material (McBride 1984: 132).

Settlement patterns during the Early Woodland Period within the Lower Connecticut Valley are similar to the preceding Late Archaic and are characterized by regular seasonal movements with population aggregations along the main channel of the Connecticut River and interior lakes and wetlands (McBride 1984: 130-131). Limited shellfish exploitation, comparable to levels seen during the Late Archaic, is evidenced in the valley during this phase. However, it does not constitute a major part of the diet (McBride 1984: 296-297). This pattern is similar to the Laurel Beach II Site and the rest of the Lower Housatonic data set where shellfish gathering appears to be confined exclusively to later time periods.

A dearth of sites dated to the Early Woodland Period in the Lower Connecticut River Valley is similar to trends seen in the Housatonic Valley and elsewhere in the region. McBride (1984: 297-298) cites misidentification based on similarities to earlier periods (i.e. the use of Narrow Stemmed points) as a likely reason for the lack of sites assigned to the Early Woodland. However, data from the valley survey provides supporting evidence for the inferred Early Woodland population decline that has been further documented in the 30-plus years since this survey was conducted. Population decline in the valley is supported by the striking drop in the number of sites between the preceding Salmon Cove Phase (n=48) and the Early Woodland Broeder Point Phase (n=8), as well as, the complete lack of radiocarbon dates from between
2700 and 2000 BP. This data parallels results from the Iroquois Pipeline survey which found a general dearth of Early Woodland site in both the Hudson and Housatonic River Valleys. This extensive survey yielded also no radiocarbon dates from between 3000 and 2500 BP, and only three (3% of the sample) from between 2500 and 2000 BP (Cassedy 1998).

The Middle Woodland Period in the Lower Connecticut River Valley is expressed by the Roaring Brook Phase. This phase dates to 2000-1200 BP and is characterized by a continuation of a quartz cobble industry and the use of Narrow Stemmed projectile points, dentate-stamped ceramics, and a small increase in non-local lithic materials which become more prevalent by the end of the phase (McBride 1984: 134-135). Non-local lithics which are described as “New York flints” comprise 5% to 10% of lithic assemblages early in the Roaring Brook Phase and increase to between 10% and 20% of the raw material by 1200 BP (McBride 1984: 136). The addition of non-local lithic material to the still overwhelming quartz lithic economy is the most important contrast, aside from changes in ceramics, between the Early and Middle Woodland Periods in the valley (McBride 1984: 137). The continuation the quartz cobble industry and the use of Narrow Stemmed point through the Roaring Brook Phase again parallels the continued use of this technology at the Laurel Beach II Site and the greater Housatonic River Valley. The close association of the Fox Creek point and Narrow Stemmed points at Laurel Beach II suggest that both were used during the Middle Woodland at that site. This pattern appears to extend through the Lower Housatonic River Valley as well, where Narrow Stemmed points were considered the “everyday” point of the Middle Woodland Period (Cassedy 1998: 176-177). The inclusion of low percentages of New York chert in assemblages from the Connecticut Valley is similar to numbers from the Housatonic. However, the continued increase in chert materials after 1500 BP varies from the pattern in the Housatonic, where this date is seen as the peak of non-local lithics
which then begin to decline in quantity. It appears that as connections with the Hudson Valley were waning in the Housatonic, they were expanding in the Connecticut River Valley.

While the settlement pattern for the Roaring Brook Phase remained poorly defined, the majority of the sites located during the Lower Connecticut River Valley survey were seasonal camps associated with developing tidal marshes and riverine wetlands (McBride 1984: 138). The lack of interior camps in the Connecticut Valley during the Middle Woodland suggests that populations were occupying the riverine areas for increasingly longer periods of time (McBride 1984: 306). The major difference in settlement patterns between the Early and Middle Woodland in the Lower Connecticut River Valley was an increased frequency of in aggregation sites in riverine areas, more than half of which were associated with the developing tidal marshlands. These larger seasonal campsites were complimented by task-specific sites situated on terraces and in upland areas. While there is no evidence of year-round occupation at any of the aggregation sites within the Lower Connecticut Valley, that pattern suggests that residential moves were likely confined to the riverine zone. This overall pattern appears to be indicative of a trend toward increased sedentism in riverine and estuarine environments that was occurring through the Middle Woodland (McBride 1984: 311-312). This settlement pattern is similar to that defined for the Middle Woodland in the Lower Housatonic River Valley, where there was similar evidence for increased aggregation in the riverine and coastal zone and a decrease in upland base camps (Cassedy 1998: 206).

In the Lower Connecticut River Valley, the end of the Middle Woodland and the Late Woodland Periods are combined in the Selden Creek Phase dating to 1200-450 BP (McBride 1984: 140). Part of the justification for this non-traditional incorporation of the late Middle Woodland with the Late Woodland Period is the appearance of Levanna projectile points in
assemblages dating to after 1200 BP (McBride 1984: 308). The lithic assemblages during the Selden Creek Phase are characterized by an increased use of non-local raw materials that were likely sourced from the Hudson Valley. These comprise approximately 20% of the lithic assemblages in the beginning of this phase to a maximum of 60-70% by its end (McBride 1984: 323). Diagnostic projectile points of the Selden Creek Phase are those traditionally assigned to the Late Woodland Period, namely Levanna and Madison types. Ceramic assemblages are comprised of types assigned to the Sebonac Phase which exhibit brushed, cord-marked, plain, and stamped designs. Dentate stamped decoration became relatively rare but was still present (McBride 1984: 140-141). While the ceramic assemblages of the Selden Creek Phase appear to be relatively similar to those that were recovered from Laurel Beach II, the lithic assemblages contrast quite drastically. Levanna points are absent from the Late Woodland shell midden at Laurel Beach II and are relatively rare in the Housatonic Valley in general. At Laurel Beach II Narrow Stemmed Tradition points were continued to be used into the Late Woodland Period, possibly in place of Levanna triangles. The lack of Levanna points in the Housatonic suggests that this trend may have been geographically spread throughout the Housatonic drainage. The dramatic increase in non-local Hudson Valley cherts found in the Connecticut Valley assemblages is also strikingly different than the almost complete drop off of these materials during this period in the Lower Housatonic Valley. It seems there is a reorganization of connections between the Hudson, Housatonic, and Connecticut valleys that began during the Middle Woodland and continued through most of the Late Woodland Period. The impetus behind these changes remains unclear but they may be related to the trend toward increased sedentism and inferred territoriality occurring during this time.
Settlement patterns of the Selden Creek Phase demonstrate a trend toward increasing sedentism in riverine areas where groups were returning to the same location over a long period of time and or residential moves were confined to a relatively small area (McBride 1984: 140-141). The trend toward aggregation in coastal and riverine zones continues through the Selden Creek Phase, as is distinctly different from the Middle Woodland in that year-round occupation is suggested at large riverine sites like the Selden Island Site in East Haddam, Connecticut (McBride 1984: 326). The extensive faunal assemblage from Selden Island indicates that occupants of the site exploited a wide variety of micro-habitats through several seasons. Furthermore, the presence of cooking, storage, refuse and features related to ceramic manufacture all point toward year-round occupation of this site (McBride 1984: 326-327). In absence of evidence of horticulture found during the Lower Connecticut River Valley survey, the increased aggregation and sedentism in the valley was equated with the developing tidal marshes in the Connecticut River Estuary. However, horticulture could not be ruled out as a catalyst for semi-permanent settlement (McBride 1984: 329). More recent studies have demonstrated that maize was present at some Late Woodland sites in or near the Lower Connecticut River Valley, including one possible kernel form Selden Island, a single kernel from Mago Point in Waterford, and 45 kernels, two carbonized cobs, and one “corn cake” from the Tubbs Site in Niantic (McBride and Dewer 1987: Table 21.1). The increase in aggregation and sedentism that was focused along riverine and coastal estuaries observed in the Lower Connecticut River Valley survey is also paralleled in the Lower Housatonic. The presence of maize at several of the sites around the Housatonic Estuary demonstrates that maize was also a part of the subsistence economy in the coastal zone. However, fact that trends toward sedentism in this zone predate the
adoption of domesticated cultigens by several centuries supports the idea that coastal sedentism was based on the ability to exploit estuarine and marsh resources.

Overall the Lower Housatonic and Connecticut River Valleys share many similarities in stone tool use and settlement patterns during the Woodland Period. The continued use of a quartz cobble industry to produce Narrow Stemmed Tradition points persists well into the Woodland Period in both valleys. However, the replacement of these points with the Levanna type is much more prevalent in the Connecticut River Valley while Narrow Stemmed points continue to be used throughout the Late Woodland Period in the Housatonic. The differences in regional connections that are reflected in the proportions of exotic raw materials in the lithic assemblages show some striking and interesting contrasts between these two valleys. Both valleys appear to be connected with the Hudson Valley in differing capacities at different times during the Woodland Period. During the Early and Middle Woodland Period groups occupying the Housatonic River Valley appear to be relatively well-connected with the Hudson. This connectedness appears to wane during the late Middle Woodland and is nearly absent during much of the Late Woodland, rising again at the end of this period, after AD 1500. Almost the exact opposite pattern is observed in the Lower Connecticut River Valley, where Hudson Valley cherts are nearly absent from the Early Woodland assemblages and increase in proportion through the Middle Woodland and are heavily represented in Late Woodland assemblages. This flip-flop in the proportions of Hudson Valley chert between the Lower Housatonic and Connecticut River Valleys suggest groups in the Connecticut Valley may have become more connected with those in the Hudson as relationships between groups in the Housatonic and the Hudson weakened. The distribution of Levanna points which were abundant in the Hudson Valley, nearly absent from the Housatonic, and were prevalent in the Lower Connecticut Valley
supports the idea division of the Housatonic and the Hudson and the connection of the Connecticut and Hudson valleys in the Late Woodland.

**Narragansett Bay**

In order to gain a better perspective on the variability in stone tool use and connectedness of Woodland Period thus far explored in the Housatonic and Connecticut valleys the comparative analysis was expanded to Narragansett Bay. The Greenwich Cove Site was chosen for this analysis because of its similar temporal and geographical setting as the Laurel Beach II Site and the site’s well published record (Bernstein 1990a, 1990b, 1993; Callahan 1981).

Interesting parallels and distinct contrasts were observed between Laurel Beach II and the rest of the Connecticut data and the Greenwich Cove Site. The trends toward the intensified reliance on shellfish, the increased use of local lithic raw material, and the increased level of sedentism through time that were seen at Laurel Beach II are also apparent at Greenwich Cove. These sites differ in that although the use of quartz cobbles as a source of raw material continues throughout the Woodland Period at both sites, Levanna points rather than Narrow Stemmed types were being produced during the Late Woodland Period at Greenwich Cove. Overall it appears that Woodland Period settlement patterns remain consistent between Narragansett Bay and the Connecticut, however the magnitude of regional connections remain variable.

The multicomponent Greenwich Cove Site is located near the base of Potowomut Neck in Warwick, Rhode Island. The site is situated on the crest and southern slope of a glacial outwash terrace that overlooks the saltwater Greenwich Cove estuary to the north and abuts a small kettle pond to the south. The site consists of a Late Archaic quartz workshop on the top of the terrace and an approximately 260-square meter kidney-shaped shell midden on its southern slope. The shell midden was the product of repeated occupations spanning the Terminal Archaic
through the Late Woodland Periods and appears to be unrelated to the adjacent Late Archaic occupation (Bernstein 1990b: 329).

The shell midden at Greenwich Cove was dated by the presence of diagnostic projectile points, ceramic sherds, and 12 radiocarbon dates that range from 2720 +/- 120 BP to 330 +/-70 BP (Bernstein 1993: 23). The 2720 BP occupation was assigned to the Terminal Archaic by Bernstein on the basis of four Orient Fishtail points that were recovered from the bottom level of the midden and the absence of ceramics. It should be noted that this third millennium BP date falls within the timespan that is considered to be the Early Woodland in this thesis (see Chapter 2) whereas Bernstein (1990b: 324, 329) defines the Early Woodland as 2500 – 1700 BP. Discussion of the inclusion of the Orient phase within the Terminal Archaic or the Early Woodland Periods is beyond the scope of this thesis but the phase does appear to truly represent a transition between the Archaic and Woodland Periods (see Donta 2003; Kraft 2001: 152; Ritchie 1959). Regardless of the cultural distinction, the 2720 BP occupation was confined to a relatively small portion of the midden that was comprised of quahog shells, white-tailed deer, and unidentified fish bones (Bernstein 1990b: 329; 1993: 38-39). This component represents the estimated earliest shellfish exploitation along Greenwich Cove, although older dates of 4000 +/-110 BP and 3850 +/- 120 BP have been obtained from shellfish remains elsewhere along Narragansett Bay (Bernstein 1990b: 329). This pattern of shellfish exploitation fits well with coastal Connecticut where there is also limited evidence of shellfish exploitation during the Late/Terminal Archaic Periods (McBride 1984: 296).

The Early Woodland occupations at Greenwich Cove are relatively small in size suggesting, a continuation of short term occupations and a minor reliance on shellfish resources during this time. Seasonality information obtained from quahog shells and white tailed deer teeth
associated with the end of this occupation (circa 1700 BP) demonstrates that shellfish were collected during the summer, as well as between October and March, and that deer were hunted between February and June (Bernstein 1990a: 109). These data suggest the short term occupations during the Early Woodland occurred at different times throughout the year.

The Middle Woodland occupation at Greenwich Cove was identified based on the presence of grit-tempered dentate stamped ceramics and radiocarbon dates of 1060 +/- 60 BP and 1130 +/- 90 BP. Interestingly no diagnostic Middle Woodland projectile points were recovered from the site. The lack of diagnostic projectile points and the fact that grit-tempered dentate-stamped ceramics also occur during the Late Woodland Period along with the very late Middle Woodland radiocarbon dates may suggest that portions of the midden that were assigned to this period are actually part of the early Late Woodland occupation. Considering that components with post-1200 BP dates were combined with the Late Woodland in the Housatonic and Connecticut surveys it may be helpful to think of this occupation at Greenwich Cove as part of the Late Woodland or at it at least represents a transition to that period. Bernstein does not provide an age range for what he defines as the Middle Woodland but states the mean date for the period at 1100 BP (Bernstein 1990a: 97; 1990b: 329). Regardless, there was an increased area of use the midden evidenced by its expanded size and the greater number of vertebrate species exploited during this time (Bernstein 1990b: 343). These patterns suggest a more intensified occupation of Greenwich Cove beginning around 1100 BP. Seasonality data from quahog shells that were associated with this occupation show that all months of the year with the exception of March through June are represented in the shellfish assemblage (Bernstein 1990a: 109). These data strongly suggest that the population occupying the Greenwich Cove site was practicing a more sedentary settlement pattern by Middle/Late Woodland Period transition.
The most extensive occupation of the Greenwich Cove sites occurs firmly within the Late Woodland Period and was identified based on the presence of Levanna projectile points, shell-tempered ceramics that were decorated with scallop shell and cord-wrapped stick impressions, and four radiocarbon ages that were younger than 850 +/- 70 (Bernstein 1993: 42-44). In fact, half of the radiocarbon ages that were obtained from the shell midden are younger than 1060 +/- 60 BP (Bernstein 1993: 23) suggesting that the site was most intensively used during the Late Woodland. The volume of shell remains and the overlapping ranges of the radiocarbon ages for this occupation suggest the site was used “more or less continuously over a number of centuries” during the Late Woodland (Bernstein 1993: 42). Seasonality data from this occupation suggest that the main season of shellfish collecting was October and November, although summer deaths are lightly represented. The analysis also indicated that deer was hunted between October and June. Bernstein finds this evidence to indicate a mainly winter-occupation for the Greenwich Cove site but strongly suggests residential stability at the site during the Late Woodland (Bernstein 1990a: 109-110). The increased reliance on shellfish and general intensity of occupation during the Late Woodland at Greenwich Cove is similar to the increased sedentism inferred by the faunal assemblages from Laurel Beach II and the overall data from the Lower Housatonic and Connecticut River valleys.

As with the Laurel Beach II Site, the evidence of increased sedentism that is demonstrated by the faunal assemblage from Greenwich Cove is also reflected in the lithic assemblage. Lithics recovered from the shell midden at Greenwich Cove shows a similar trend in the use of more diverse and exotic lithic raw materials during the earlier occupations and a near-exclusive reliance on local stone sources during later occupations. At Greenwich Cove, the lower Terminal Archaic-Early Woodland levels of the midden contained a diversity of non-local lithic
materials, mainly argillite with rhyolite and some quartz, while the upper levels nearly exclusively contained quartz. In a representative sample of the lithic assemblage from Greenwich Cove the lower levels of the midden contained 18.6% quartz while the upper levels were dominated by 99.7% quartz. The excavators logically equated the large amount of cortex on this quartz as being indicative of local acquisition (Callahan 1981: 78-79). These raw material proportions were paralleled in the point assemblage from the shell midden where all but one of the Late Archaic points were made of non-quartz material and all of the Levanna points were made of quartz (Bernstein 1993: 33). While the sources of the argillite and rhyolite that was recovered from Greenwich Cove were not discussed, both could have been obtained from the greater Narragansett Bay region. Green argillite that is macroscopically similar to material used at numerous pre-contact sites around Narragansett Bay outcrops on Brenton Point in Newport, Rhode Island (Strauss 1989: 30). Also rhyolite that is referred to as “Attleboro Red” is known to have been prehistorically quarried from several outcrops in the Providence River drainage in Attleboro, Massachusetts (Strauss and Murray 1988: 44-47). The diachronic change in lithic raw material acquisition demonstrated at Greenwich Cove suggests that by the Late Woodland the population occupying the site were exclusively using locally-obtained quartz, possibly no longer having access to these other sources of raw material. While these potential sources of raw material are not as distant as the Hudson Valley chert recovered from Laurel Beach II or the Connecticut River Valley the disuse of these sources in the greater Narragansett Bay region may represent increased territoriality in the Late Woodland, although a material preference cannot be ruled out. Interestingly chert is completely absent from the point assemblage from Greenwich Cove and is only represented by a single artifact that comprises 0.2% of the representative raw material assemblage published by Callahan (1981: 78), suggesting the groups occupying
Greenwich Cove did not have the same connections with the Hudson Valley that those living in the Housatonic and Connecticut River valleys did.

While there is an increased reliance on local lithic raw material sources, namely quartz cobbles, at both the Greenwich Cove and the Laurel Beach II sites, important differences in the chronology of the tool assemblages also exist between them. At Greenwich Cove the manufacture and use of Narrow Stemmed points appears to be confined to the Late Archaic occupation, while the use of these points continues uninterrupted throughout the Woodland Period at Laurel Beach II and well into the Woodland elsewhere in the Housatonic and Connecticut River valleys.

In the absence of organic material that could be dated, the quartz workshop on the top of the terrace was assigned to the Late Archaic based on the presence of six Brewerton, one Snook Kill and one Orient Fishtail point (Bernstein 1993: 32-35, 37). The fact that the majority (n=44) of the points on the terrace belong to the Narrow Stemmed Tradition casts some uncertainty on this occupation belonging solely to the Late Archaic, especially with the adjacent shell midden with that was mainly occupied during the Woodland Period. However, the data presented by Bernstein (1993) makes a solid case for the exclusively pre-Woodland Period association of the Narrow Stemmed points at Greenwich Cove. The most compelling evidence is the lack of ceramics from the top of the terrace, which were recovered from every Woodland Period occupation layer within the shell midden, and the differences in point styles represented at both loci. The Narrow Stemmed points on the terrace were associated only with other Late Archaic point types while no diagnostic Late Archaic points were recovered from the shell midden matrix. The two Narrow Stemmed points recovered from the area of the shell midden were recovered from the underlying subsoil as was a Brewerton. The points recovered from within the
shell midden consisted of four Orient Fishtail points associated with the Terminal Archaic/Early Woodland component, seven untyped points, and 17 Late Woodland quartz Levanna points (Bernstein 1993: 32-37). The fact that the majority (74%) of the points recovered from the shell midden are the Levanna type supports evidence from ceramic assemblage and the radiocarbon data that demonstrates the midden was most extensively used during the Late Woodland. The fact that none of the Levanna points were recovered from the top of the terrace suggests a real separation of these loci. Furthermore, the presence of Levanna points at Greenwich Cove removes a need to look for alternative point types that may have been in use during the Late Woodland occupations. In contrast, to Laurel Beach II and the other data from the Lower Housatonic River Valley (e.g. Cassedy 1998), where the association of Narrow Stemmed points with the late-Middle and Late Woodland Periods was in part based on the absence of other point types that are considered to be diagnostic of these periods, Greenwich Cove demonstrates the use of “classic” point types during the Late Woodland. While this contrasts with the Housatonic, the use of Levanna points is also similar to the Lower Connecticut River data set.

Overall the trend toward increased sedentism over the course of the Woodland Period that was seen in the Connecticut data appears to have also occurred in Narragansett Bay. The use of Narrow Stemmed points, however, appears to be confined to the Late Archaic in this region. Interestingly, the lack of Hudson valley cherts in any of the components at Greenwich Cove and the exclusive use of materials that were local to Narragansett Bay it suggests that groups in the bay may not have been connected with Hudson valley at any point during the Woodland Period.

Cape Cod

Finally, to conclude the examination of Woodland Period variability in coastal Southern New England the comparative analysis of the Laurel Beach II Site was expanded to the outer
shore of Cape Cod. The Woodland Period archaeological record from Cape Cod is more similar to Narragansett Bay than Laurel Beach II or the Connecticut data sets, although the seemingly regional trend toward increased sedentism and the importance of estuarine resources is also apparent in this area. The data from Cape Cod does little to illuminate the chronological issue of Narrow Stemmed points, which is referred to as the “Small Stemmed Tradition” or “Squibnocket Complex” in Massachusetts. However, there is some indication that these points may have been used during the Woodland Period on Cape Cod. Limited amounts of exotic lithic materials suggest that Native groups on Cape Cod did not participate in the regional exchange networks to the extent of those residing in Connecticut. However, the situation surrounding lithic raw material sourcing on Cape Cod is somewhat unique, in part due to the absence of bedrock, and will be discussed separately at the end of this section. Most of the Cape Cod data comes from the systematic survey of the Cape Cod National Seashore that was conducted between 1979 and 1981 on the outer arm of which investigated 179 loci or “concentrations” at 17 sites (McManamon 1984a, 1984b and the chapters within). This study unit was supplemented by published reports from other Woodland Period sites (Bradley 2005; Moffett 1951).

In terms of settlement patterns the data from Cape Cod supports a trend towards aggregation and sedentism that is focused in coastal zones and progresses throughout the Woodland Period. The National Seashore survey found that Late Archaic sites were the most frequent and widely dispersed of all the concentrations investigated. Sites dated to this period were identified in coastal as well as upland zones, including having the highest density at High Head in Truro, an area specifically described as being away from estuarine and shellfish resources (McManamon 1984b: 401-403). However, the tendency for sites containing high proportions of quartz debris with no diagnostic artifacts or radiocarbon data to be classified as
Late Archaic during the analysis of this survey may have skewed the interpretations of site frequency for this period. Many of the Late Archaic concentrations that were identified during the survey were at multi-component sites with large Woodland Period occupations (Borstel 1984a: 251-252).

Regardless of the potential issues surround the Late Archaic representation in the Seashore survey, the study demonstrates that there is clear evidence of a progressively intensified focus on coastal resources during the Woodland Period. The Early Woodland Period is the least represented cultural period on the outer Cape. Out of the 24 radiocarbon dates obtained during the Seashore survey, none returned dates from the third millennium BP (Borstel 1984a: 266). Evidence of Early Woodland occupations from the National Seashore survey consisted of a few instances were projectile points or ceramics dating to this period were recovered from mix contexts that also contained Middle Woodland materials (McManamon 1984b: 403). However, a relatively substantial Early Woodland occupation of the outer Cape was later discovered at the multi-component Carns Site located on Coast Guard Beach, just to the north of the Nauset Marshes on the outer beach. At the time of the Early Woodland occupation, the Carns Site was adjacent to a freshwater marsh that was separate from the Nauset Marsh system. The Early Woodland is represented at the site by a number of Lagoon and Rossville type points and a series of four radiocarbon dates ranging from 2400 to 2020 BP. The Early Woodland occupation at the Carns Site has been interpreted as a short term, likely winter occupation that was repeatedly used over many seasons and likely focused on an adjacent freshwater marsh (Bradley 2005: 47-48).

The low number of Early Woodland sites identified and the lack of third millennium BP radiocarbon dates on outer Cape Cod parallels the record from between the Hudson Valley and Narragansett Bay and supports the notion of a regional population decline during this period.
The Middle Woodland Period is significantly better represented on the outer Cape, both in the number of sites and the intensity of occupations inferred by the density of artifacts and the accumulation of refuse debris. Data from the National Seashore survey demonstrates a tendency for Middle Woodland sites to be associated with dense middens containing the remains of shellfish, animal and fish bone, and other refuse. (McManamon 1984b: 403). Aside from four dates falling within the fourth millennium BP the majority of radiocarbon dates from the Seashore survey comprise a group that begins approximately 1600 BP and extends to the recent past. Due to the large error ranges which average +/-150 years associated that are with these dates it is sometimes difficult to determine if the radiocarbon ages are associated with Middle or Late Woodland occupations. However, it appears that there are at least 10 radiocarbon dates (42%) associated with the Middle Woodland from the Seashore survey (Borstel 1984a: 266-267). Intra-site patterning of Middle Woodland components from the Seashore shows that activities were more spatially consolidated than during previous periods, suggesting longer term and more condensed occupations. Sites with Middle Woodland components also had a more restricted geographical distribution than previous periods. These were mainly concentrated on estuaries, including Fort Hill which overlooks the Nauset Marshes to the north and Town Cove to the south, and along the north side of Salt Pond in Eastham (McManamon 1984b: 403). A similar pattern is seen at the Carns Site, where use of the site was most intensive during the Middle Woodland Period. Numerous rocker-stamped ceramics and points related to the Fox Creek Phase were recovered from the Middle Woodland component at Carns. A diversity of features including a roasting platform, hearths, post molds, and refuse pits indicate longer duration occupations of this site during the Middle Woodland. Interestingly, aside from a few fragments, shellfish remains were not recovered from the Carns Site. The fauna and flora from this
occupation of the Carns Site include the remains of large mammal (probably deer), turtle, and possibly sturgeon, indicating a diverse subsistence economy focused on the adjacent freshwater marsh and forest. What is perhaps most interesting about the Carns Site is that Native use of the area dramatically drops off at the time the adjacent freshwater marsh transitions to salt marsh (Bradley 2005: 48-50). The general pattern of an increased number of sites, with longer duration occupations during the Middle Woodland on the Outer Cape parallels the settlement patterns seen in the Housatonic and Connecticut River valleys and that in Narragansett Bay. The increased focus on estuarine resources that was demonstrated in these areas to the west was also seen in the National Seashore survey data. However, the decline in use of the Carns Site that coincides with the adjacent marsh transitioning to saltmarsh is anomalous.

The Late Woodland Period on Outer Cape Cod is represented by an increase in site frequency and density. Twenty nine concentrations were assigned to the Late Woodland during the National Seashore survey. There is a continuation in the formation of large shell middens associated with this period. Similar to Middle Woodland occupations, a wide range of activities that were associated with tool manufacture and food processing were identified as occurring within or nearby settlement areas. However, the material representation of these activities was much more intense, suggesting they were the product of larger populations and longer durations of occupation (McManamon 1984b: 404-405). For example, the intensification of resources was seen in a portion of the faunal assemblage from a midden at 19-BN-308 on Fort Hill that had radiocarbon-dated Late Archaic and Late Woodland occupations allowed for a diachronic comparison of the subsistence practices at that site. The analysis demonstrated that Late Woodland populations were more likely to harvest small mammals and fish such as skate, eel, and herring than those occupying the same location during the Late Archaic (Spiess 2011: 37).
Sites locations during the Late Woodland continued to be concentrated around estuaries like the Nauset Marshes and Salt Pond in Eastham and there is a noticeable dearth of Late Woodland material at High Head in Truro, an area that is located some distance from shellfish resources. There were also a greater number of special purpose site locations during the Late Woodland that were identified around the estuaries. These included lithic reduction at cobble sources and suggested a pattern of logistical forays away from the main camp that focused on for specific purposes (McManamon 1984b: 404-407). In contrast to the Nauset Marsh sites, the nearby Carns Site appears to have limited occupation during the Late Woodland (Bradley 2005: 50-51). This is perhaps related to the trend to aggregation around the major estuaries of the Outer Cape. Taken together, the density and diversity of archaeological remains recovered from Middle and Late Woodland sites during the National Seashore survey suggest sedentary, relatively long term occupations of estuary environments during these periods. The absence of widely distributed sites dating to these periods was also seen as negative supporting evidence for the Nauset Marsh system being the focus of year-round occupation during the late pre-contact period (McManamon 1984b: 409). This parallels the evidence for semi-permanent settlements in coastal areas during the Late Woodland Period seen thus far in the lower Housatonic and Connecticut valleys and Narragansett Bay.

The limited volume of exotic lithic materials recovered on the Outer Cape suggests that Woodland Period groups had limited inter-regional connection on a similar scale to those residing in Narragansett Bay. The geologic history of Cape Cod presents a rather unique issue to the acquisition of lithic raw materials. There are no bedrock outcrops on Cape Cod. In fact the underlying bedrock is buried by 200 to 600 feet of sand (Oldale 1992). Therefore, all lithic raw materials had to be either obtained locally from cobbles of suitable materials that were mixed
into the glacial drift or acquired from mainland sources, either by trade or direct acquisition. Material that is suitable for stone tool manufacture that was available on Cape Cod includes quartz, quartzite, and various rhyolites that could be picked up on beaches or from eroding marine scarps (Borstel 1984b: 292). These secondary sources must have provided an adequate supply of toolstone as local lithic materials dominate the archaeological assemblages on Cape Cod. For example, out of the more than 51,300 lithic artifacts recovered during the National Seashore survey only 236 or 0.5% of them were cherts that were not available locally (Borstel 1984b: 311). The majority of the chert recovered during the Seashore survey consisted of yellow-brown jasper which for the purposes of the survey was combined with the chert category. However, examples that were visually similar to cherts from New York State, Munsungun Lake in Maine, and Flint Ridge in Ohio were represented in the chert assemblage from the Seashore (Borstel 1984b: 320). Chert on the Outer Cape appears to be loosely connected with the Jack’s Reef Phase of the Middle Woodland Period, as the highest density of this material was found associated with a Jack’s Reef component at site 19-BN-274/339 on the south side of Salt Pond in Eastham. However, the chert assemblage from this site comprised only 3.6% of the assemblage, which was the highest proportion of chert at any site identified during the Seashore survey (Borstel 1984b: 326). This proportion of chert is significantly lower than what is typically found in Jack’s Reef assemblages in the region (e.g. Goodby 2013; Strauss 1992) and suggests populations living on the Outer Cape may have been more insular than groups living elsewhere in the region (Mahlstedt 1986b: 40). This insular notion of Cape Cod populations is also supported by materials that were curiously absent from the Early Woodland assemblage of the Carns Site. Interestingly, neither Vinette I ceramics, Meadowood points, and aside from one Lagoon point made of Champlain valley chert, no exotic lithic materials were recovered from
this site (Bradley 2005: 47). The very low proportions of exotic materials in the Early and Middle Woodland components on the Outer Cape suggest that while Native populations on the Cape did engage in regional exchange, their participation did not reach the magnitude of populations living elsewhere in southern New England.

While the patterns of lithic acquisition and settlement on Cape Cod are quite clear, the chronological issues of Narrow Stemmed Tradition points remain somewhat ambiguous. Narrow Stemmed points were the second most common point type recovered during the National Seashore survey, second only to Levanna points (Borstel 1984a: 293). While they were recovered from numerous sites that also had Woodland Period components, they were categorically considered to represent Late Archaic occupations at these locations. Unfortunately, while the reporting is quite extensive, the resolution in the reporting of the Seashore sites does not allow for an assessment the contextual relationship with Narrow Stemmed points and Woodland Period artifacts at the concentrations that contained both. However, five of the Seashore concentrations that returned Middle Woodland or younger radiocarbon ages included Squibnocket Triangles (Borstel 1984a: 251-261). In another instance, a shell feature at 19-BN-341 dated to 1075 +/- 110 BP was adjacent to a unit that yielded a Squibnocket Stemmed point and five Levanna triangles, however the presence of two Terminal Archaic Wayland Notched points indicates a truly mixed context for this find (Borstel 1984a: 259). The presence of a single Narrow Stemmed point at the Locus 10 of the Carns Site, which otherwise contains and entirely Woodland Period assemblage is suggestive but not conclusive of a Woodland Period association for this artifact (Bradley 2005: 47). Less ambiguous data that supports the use of Narrow Stemmed points in the Woodland Period was found in the stratified Rose Site shell midden in Truro, although this remains a single example. The association of Narrow Stemmed points with
the Middle Woodland assemblage at the Rose Site shell midden in supports the continued use of these styles at least in some capacity into the Middle Woodland Period. The depiction of artifacts from the Rose Site midden in Moffett’s (1951: 100) Figure 44 shows Squibnocket Stemmed and other Narrow Stemmed types in clear association with Fox Creek Phase artifacts. Importantly, this figure demonstrates that the stratigraphic association of point styles at the Rose Site is in agreement with the accepted chronology identified in regional typologies. Also, Narrow Stemmed points are not depicted in association with Late Woodland Levanna types (Moffett 1951: 100) suggesting their use was discontinued by the Late Woodland. It seems likely that they were wholly replaced by Levanna points as in the lower Connecticut River Valley and as suggested by the Greenwich Cove data. Considering the similarities between the Outer Cape and Narragansett Bay and the prevalence of Late Woodland Levanna types on the Cape, it seems probable that if the Narrow Stemmed Tradition extended into the Woodland Period on Cape Cod it was not sustained into the Late Woodland Period.

Similar to the other areas in Southern New England that were investigated during this study, the data from Cape Cod suggests a trend toward increasing sedentism throughout the Woodland Period. Differences in lithic material sourcing suggest that populations on Outer Cape Cod remained relatively isolated from regional exchange networks and were at no time substantially connected with the Hudson Valley, as Woodland Period groups in coastal Connecticut were. However, the prominence of Levanna type points on the Outer Cape during the Late Woodland is similar to the Hudson and Connecticut River Valleys and Narragansett Bay suggesting there were some pan-regional influences acting on the material record from Cape Cod. Questions regarding the chronological issues of Narrow Stemmed type points remained ambiguous in the Cape Cod data set.
Conclusion

The comparative analysis between the Lower Housatonic and the Lower Connecticut valleys, Narragansett Bay, and Cape Cod illuminated interesting similarities and variability that existed through time and space during the Woodland Period in coastal southern New England.

The Early Woodland is characterized by a general lack of sites across the region which supports theories of a population decline at this time. There is also a general increase in settlement in coastal and riverine zones during this time, but occupations appear to reflect short-term temporary camps. Increased regional connections are inferred from the use of exotic lithic material that is apparent during this time in the Housatonic Valley and to a lesser extent in Narragansett Bay. The lower Connecticut Valley appears to be somewhat insular as does Cape Cod, which remains uniquely insular throughout the Woodland Period. The use of Narrow Stemmed points in the Early Woodland is well established in the Housatonic and Connecticut valleys, and is slightly suggested on Cape Cod. This differs greatly from Narragansett Bay where this technology appears to be confined to the Late Archaic Period.

During the Middle Woodland Period the regional trend toward aggregation in coastal and riverine environments continues and there is a general trend toward sedentism that increases by the end of the period. As evidence by the percentages of chert in Middle Woodland assemblages, the relationship between the Lower Housatonic and the Hudson Valleys appears to be waning during this period. Curiously it is during this time that an increase in the use of Hudson Valley chert was occurring in the Lower Connecticut River valley, suggesting that a reorganization of social and exchange networks was likely occurring. Narragansett Bay and Cape Cod appear to be relying on local sources of raw material at this time, although there is a slight increase in exotic materials on the Cape, these never comprise more than 4% of the assemblages. Narrow Stemmed
points and quartz cobble technology were both in use during the Middle Woodland in the Housatonic and Connecticut valleys and likely to some extent on Cape Cod as well.

Across the study area, the trend toward increased sedentism and use of the coastal environments culminates with semi-permanent settlement of this zone in the Late Woodland. The trend toward a reorganized connection between the Housatonic, Connecticut and Hudson River valleys continued into the Late Woodland. The lower Housatonic valley appears to have relied on the near exclusive use of local lithic materials during this time, namely quartz cobbles. In contrast, Hudson Valley cherts appear to flood the Connecticut Valley during this time. The overwhelming contribution of local materials in the lithic assemblages from Narragansett Bay and Cape Cod suggest groups in these areas remained relatively insular during the Late Woodland. Similar to the differences in connectedness, the use of Narrow Stemmed points became more geographically confined during the Late Woodland. These points remained in use in at least some areas of the Lower Housatonic and Connecticut valleys during the Late Woodland but they appear to be entirely absent form Narragansett Bay and Cape Cod.

In summary, the comparative analysis conducted across coastal southern New England demonstrates regional trends toward aggregation and sedentism that culminated in semi-permanent settlement of the coastal zone by the end of the Late Woodland Period. However, variability in stone tool use and regional connections existed across space and time. This variability suggests that as groups became more sedentary and increasingly territorial as the Woodland Period progressed, they altered their lithic technology in response to changes in their physical environmental and social landscape.
Chapter 6 General Conclusions

The general aim of this study was to increase our knowledge of the poorly understood Woodland Period in New England. More specifically the goals were to examine the Woodland Period in coastal southern New England and to highlight the similarities and variability that existed across geographic space and time during this period. Through the in-depth examination of the Laurel Beach II Site and the comparative analysis of this site and the greater Lower Housatonic River Valley with the Lower Connecticut River Valley, Narragansett Bay and Cape Cod this study illuminated settlement patterns as they related to coastal resources, regional connections and interaction networks, and issues regarding stone tool chronology. A brief summary of these findings is presented in this chapter.

Settlement Patterns

This study demonstrated that settlement patterns were remarkably consistent during the Woodland Period across coastal southern New England. A general trend toward an increased focus on riverine and coastal environments and increased aggregation and sedentism over the course of the Woodland Period was seen across the study area.

At Laurel Beach II, the ceramic and radiocarbon data securely dated the shell midden to the Late Woodland Period, indicating that the deposit had accumulated during this time. The mix of marine shells with the remains other finfish species, terrestrial mammal and bird bones, along with nutshell fragments, and lithic and ceramic debris strongly suggests this was a secondary deposit indicative of more sedentary populations. This was in contrast to the underlying Early-Middle Woodland assemblage that was comprised mostly of lithic debris with fewer numbers of ceramic sherds, and a smattering of food remains. A similar pattern was seen throughout the study area. In general the Early Woodland Period was poorly represented and when sites were identified they tended to be short-term campsites that were more prevalent in riverine and coastal
areas. The Middle Woodland was better represented in both the frequency of sites and the intensity of their occupation. A trend toward sedentism was suggested by the presence of storage pit features and an increase in refuse deposits. Shellfish procurement became more important during this period as evidenced by the accumulation of shell middens at sites like 25-2 in the lower Housatonic Valley, Greenwich Cove in Narragansett Bay, and 19-BN-308 overlooking the Nauset Marshes on Cape Cod. By the Late Woodland Period, groups residing in the coastal zone throughout the study area were exercising a semi-permanent settlement pattern. This was evidenced by sites with large shell midden accumulations, storage pits, and a generally more intense material record of occupation. Maize remains were prevalent at several sites in the Lower Housatonic and on Cape Cod further suggesting more sedentary occupations.

**Regional Connections**

The regional connections that were examined in this study proved to be very diverse. These connections were inferred on the basis of the amount of exotic raw material that was included in the lithic assemblages associated with different time periods. Overall, groups living in Connecticut appeared to be more connected with those outside the region than groups residing further to the east in Narragansett Bay and on Cape Cod. These connections also fluctuated through time and a general trend of regional interaction cannot be described for the study area.

Native groups within the Housatonic and Connecticut River Valleys appear to have maintained connections of varying capacity with those in the Hudson Valley at different times during the Woodland Period. At the Laurel Beach II Site, Hudson Valley chert comprised 39% of the Early-Middle Woodland lithic assemblage indicating a strong connection with the Hudson Valley. Several aspects of the lithic analysis indicated that chert was brought to the site in the form of partially reduced bifaces or flake blanks. The high discard threshold for this material at
Laurel Beach II indicated its value and suggested it may have been a trade item. Although not as high as at Laurel Beach II, a higher percentage of chert in the lithic assemblages was also seen in other Early and Middle Woodland sites in the lower Housatonic valley. These connections appear to diminish sometime after 1500 BP and chert was almost completely absent from the Lower Housatonic during the Late Woodland. Interestingly, the near opposite of these patterns is seen in the Lower Connecticut River Valley. Chert was almost nonexistent during the Early Woodland Period and gained importance during the Middle Woodland and tended to dominate assemblages during the Late Woodland Period. This near reversal in connections likely represents a reorganization of the social landscape where groups in the Connecticut River Valley became more entwined with those in the Hudson Valley as groups in the lower Housatonic became more isolated as the Woodland Period progressed.

Lithic sourcing data from Narragansett Bay and Cape Cod demonstrate that groups in these areas did not maintain the level of interaction with the Hudson Valley that groups living in Connecticut did. However, the pattern of connections from Narragansett Bay mimics the general trend seen in the Housatonic of more dispersed connections during earlier time periods to more restricted interactions later on although on a smaller scale. The record from Greenwich Cove suggests that during the Late and Terminal Archaic Periods lithic materials were sourced from a number of locations around the bay. This pattern shifts to the exclusive use of locally available quartz cobbles by the Middle and Late Woodland. Whether this pattern in Narragansett Bay reflects a general reduction of mobility and the trend toward sedentism or changes to communication and interaction networks is unclear. Regardless, this pattern demonstrates Woodland Period groups in Narragansett Bay did not maintain the same type of connections as those living in Connecticut. Likewise the extremely low quantities of exotically sourced stone in
the assemblages from Cape Cod suggest that groups living on the Cape did not participate in the regional interaction networks to the extent of other groups in southern New England.

**Stone Tool Chronology**

A major part of this study was the investigation into chronological issues surrounding projectile point typology in the Woodland Period. These questions were mostly focused on the use of Narrow Stemmed points in the Woodland Period. However, the presence of a rare Cape Stemmed point in the Late Woodland shell midden at Laurel Beach II also presented an opportunity to provide new temporal and geographical information on this type.

**Cape Stemmed Points in the Late Woodland Period**

The research conducted in preparation of the regional comparisons with the Laurel Beach II Site yielded almost no information on Cape Stemmed points. These findings or lack-there-of suggest the recovery of this point type at Laurel Beach II is all the more important. Generally, little has been published on this tool type and the temporal and geographical range of Cape Stemmed points is still poorly understood. As at Laurel Beach II, Cape Stemmed points are usually found with Narrow Stemmed Tradition tools and are likewise poorly dated. At Laurel Beach II this point was associated with the Late Woodland shell midden. Cape Stemmed points have also been recovered in Late Archaic contexts on Calf Island in Boston Harbor (Luedkte 1980 as cited in Mahlstedt 1986a), in Early Woodland contexts on Nantucket (Pearlman 1970 as cited in Mahlstedt 1986a), and in contexts that are intermixed with Narrow Stemmed Tradition and other Early and Middle Woodland artifacts on outer Cape Cod (Mahlstedt 1986a: 9). Boudreau (2016) suggests an Early or Middle Woodland date for Cape Stemmed points based on a single specimen from Locus 10 of the Carns Site on outer Cape Cod and seven radiocarbon dates associated with this locus that range from 2400 +/- 25 to 1490 +/- 35 BP (Boudreau 2016:}
113). However, a careful review of Bradley’s (2005) report on the Carns Site reveals that Locus 10 also contained three triangle points and yielded an additional radiocarbon date of 570+/-25 B.P., indicating that there is also a Late Woodland occupation (Bradley 2005: 46, 113, 122). An image of one of these triangular points (Bradley 2005: Figure 58) shows that it is unequivocally a Levanna point and confirms the Late Woodland association. Therefore making it possible that the Cape Stemmed point from Locus 10 could be associated with any of the Woodland Period occupations at the Carns Site. This association demonstrates that the Late Woodland context of the Cape Stemmed point at Laurel Beach II may not be unprecedented.

Geographically, the distribution of Cape Stemmed points clusters around southeastern Massachusetts, however their distribution is known to extend from the Boston Basin and west to at least Narragansett Bay, although the extent of their southern and western distribution is admittedly unknown (Mahlstedt 1986b: 8). Two Cape Stemmed points from Peconic Bay on the eastern end of Long Island that are in the collection of John Pagilaro shows their presence within the greater Long Island area is not unprecedented (Pagilaro personal communication 2019). It is likely that other Cape Stemmed points have been recovered from the Long Island Sound area and have gone untyped, as they were for many decades in eastern Massachusetts. The presence of the Cape Stemmed point at Laurel Beach II should also help broaden the geographic range of this point type.

**Narrow Stemmed Points in the Woodland Period**

The research conducted at the Laurel Beach II Site and for the comparative analysis of this assemblage has notably contributed to the chronological issues surrounding Narrow Stemmed Tradition points. While all regional archaeologists can agree that Narrow Stemmed points were made and used during the Late Archaic, the evidence presented here has
demonstrated that in some areas across coastal southern New England this tool making tradition persisted well into, and in some cases, throughout the Woodland Period.

The presence of three quartz Narrow Stemmed Tradition points, along with evidence of the quartz cobble industry that is associated with producing them in the well-dated Late Woodland shell midden at the Laurel Beach II Site provides evidence of a clear association of this tradition with the Late Woodland Period. Further evidence of the use of Narrow Stemmed points well into the Woodland Period in the Housatonic drainage was found during the Iroquois Pipeline Project. The high frequency of features dating to the Late Woodland and the lack of Levanna points recovered during this survey also hint at the inclusion of Narrow Stemmed points within the Late Woodland in the lower Housatonic.

Further evidence for the inclusion of Narrow Stemmed Tradition points in Woodland Period toolkits was also found throughout the lower Connecticut River Valley. There, a quartz cobble industry and Narrow Stemmed points were also seen as the every-day point type for Early and Middle Woodland populations. Data from the Old Lyme Shell Heap at the mouth of the Connecticut River clearly associated Narrow Stemmed points with Late Woodland occupations, including the inclusion of two Wading River points with a Late Woodland Sebonac Phase burial.

In contrast, data from the Greenwich Cove Site seems to strongly indicate that Narrow Stemmed points were solely associated with the Late Archaic Period in Narragansett Bay, or at least at Greenwich Cove. However, data regarding Narrow Stemmed points from Cape Cod is more ambiguous. It remains unclear whether Narrow Stemmed points play any kind of prominent role in Woodland Period assemblages in that area, although the evidence hints at their presence in at least some Woodland Period assemblages.
Interestingly, the historic period Hackney Pond Phase of the Lower Connecticut River Valley sees a “reappearance” of a quartz cobbles industry that is characterized by narrow, stemmed projectile points and a corresponding decrease in the amount of non-local lithic material (McBride 1984: 354). McBride does not go as far as to call these Narrow Stemmed Tradition points, most likely due to the break in the use of these points during the Late Woodland within the Lower Connecticut Valley. However, the presence of similar points made entirely of local lithic materials in the 17th century where the existence of defined group territories is well documented, lends credence to the notion that similar outcomes, i.e. the use of quartz cobbles to make Narrow Stemmed points, may have occurred as groups became more sedentary and territorial during the Late Woodland Period.

Collectively, these data demonstrate that the Narrow Stemmed Tradition and the quartz cobbles industry that is associated with it persisted for several millennia in coastal Southern New England. Narrow Stemmed points are found in association with artifacts found of the Late Archaic Vergennes and Squibnocket Phases, as well as the Terminal Archaic Susquehanna and Orient Phases throughout New England. These points continued to be used into the Woodland Period in Connecticut and possibly on Cape Cod where they are found with Early Woodland Meadowood and Lagoon points and Middle Woodland Fox Creek Phase artifacts. The data from the Laurel Beach II Site and Housatonic Valley as well as Old Lyme Shell Heap suggest these points were also in use during the Late Woodland Period, possibly in replacement of Levanna type points. These data clearly demonstrate that this technology was ubiquitous and cannot be assigned to a cultural or temporal time period without the presence of other diagnostic materials or radiocarbon data. The longevity of this technology is likely related to the function of these points and/or the limited number of formal tool forms that can be produced form quartz cobbles.
The ubiquity of quartz cobbles as a potential source of raw material like also played a role in the persistence of this technology and may have been an impetus for its continued in areas like the Lower Housatonic River Valley that appear to have become increasingly territorial through the course of the Woodland Period.

**Final Thoughts**

This study of Woodland Period coastal southern New England has demonstrated that both pan-regional trends and distinct regional variability existed during this time. It should be apparent that there is no one-size-fits-all pattern or explanation for cultural practices, even in a geographically small region like southern New England. While it has been clearly established that Narrow Stemmed Tradition points were in use throughout the Woodland Period, this pattern does not hold for all drainage systems or geographical zones within the region. When possible, radiocarbon dating rather than intuition should be used to determine the age of assemblages that only contain Narrow Stemmed tools. It should also be apparent that the use of non-local lithic materials cannot be used as a wide-ranging indicator of time period, such as the Middle Woodland, and that patterns regarding lithic sourcing may be more particular to the drainage or geographic zone a site is located in.

Many of the questions investigated in this study will benefit from further comparative analysis with other areas of coastal New England and a more in-depth review of the geographic zones that were examined here. Data that is produced from cultural resource management surveys such as the Iroquois Pipeline Project, the Cape Cod National Seashore Survey, the Laurel Beach II Project and countless others that remain under-appreciated and stored away in the offices of regulatory agencies remain largely untapped. This type of data is often gathered in a non-biased manner and can provide unique information on the cultural patterns of the pre-
contact era. It is my hope that this study will encourage others to make use of archaeological data that is generated from cultural resource management projects or at the very least encourage future research in coastal southern New England.
References


Borstel, Christopher L.


Bouchard, Michael C.

Boudreau, Jeffery


Bourn, Richard Q.

Bourque, Bruce J.
2001 *Twelve Thousand Years: American Indians in Maine.* Lincoln, NE: University of Press.

Bourque, Bruce J., and Harold W. Krueger

Bradley, James W.
2005 *Archaeological Investigations at the Carns Site, Coast Guard Beach, Cape Cod National Seashore, Massachusetts.* Northeast Region Archaeology Program, Occasional Publications in Field Archaeology Number 3. Lowell, MA: National Park Service.
Bragdon, Kathleen J.

Braun, David P.


Brockman, Mark and Barry Keegan

Bronitsky, Gordon, and Robert Hamer

Brumbach, Hetty Jo

Callahan, Kevin

Carr, Philip J. and Andrew P. Bradbury

Cassedy, Daniel F.


Childs, Terry S.


Chilton, Elizabeth S.


Claassen, Cheryl

Codding, Brian F., James F. O’Connell, and Douglas W. Bird

Coffin, Claude


Cross, John

Davis, Margaret B.

De Boer, W., Blijdenstein, A., & Longamane, F.

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<tr>
<th>Year</th>
<th>Title</th>
<th>Author/Editor</th>
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<td>1974</td>
<td>An Introduction to Archaeology in the Greater Boston Area.</td>
<td>Dincauze, Dena F.</td>
</tr>
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<td>2016</td>
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<td>Filios, Elena L.</td>
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Fowler, William S.

Frahm, Ellery

Funk, Robert E.


Funk, Robert E., and John E. Pfeiffer

Goodby, Robert G.


Hart, John P. and William Lovis

Hart, John P. and Margaret Scarry

Heckenberger, Michael J., James B. Petersen, Lousie A. Basa, Ellen R. Cowie, Arthur E. Spiess, and Robert E. Stuckenrath
Ives, Timothy H., Kevin A. McBride, and Joseph N. Waller

Johnson, Eric and Thomas Mahlstedt

Juli, Harold D.

Juli, Harold D., and Kevin A. McBride

Justice, Noel D.

Karr, Ronald D

Kelly, Robert L.

Kenyon, Victoria Bunker
1986 Middle Woodland Ceramic Patterning in the Merrimack River Valley. Archaeology of Eastern North America 14: 19-34.

Kerber, Jordan E.

King, Adam, James W. Hatch, and Barry E. Scheetz

Klein, Richard G., and Douglas W. Bird
Kostiw, Scott F.

Kraft, Herbert

Lavin, Lucianne

Lavin, Lucianne, and Lyent W. Russell

Leslie, David and Daniel Zoto

Leveillee, Alan, Joseph Waller, and Donna Ingham
2006  Dispersed Villages in Late Woodland Period South-Coastal Rhode Island. *Archaeology of Eastern North America* 34: 71-89.

Lightfoot, Kent G., and Robert M. Cerrato

Little, Elizabeth A.

Lizee, Jonathan M.

Luedtke, Barbara E.


n.d Lithic Procurement and Use on the Boston Harbor Islands. Unpublished manuscript on file at the Massachusetts Historical Commission, Boston.


Madsen, D. B and D.N. Schmitt

Mahlstedt, Thomas F.

McBride, Kevin A. 


McBride, Kevin A. and Robert Dewar 

McBride, Kevin and Mary Soulsby 

McManamon, Francis 


McManamon, Francis P., and James W. Bradley 

McWeeney, Lucinda 

Menking, Kirsten M., Dorothy M. Peteet, and Rodger Y. Anderson 
2012 Late-glacial and Holocene vegetation and climate variability, including major droughts, in the Sky Lakes region of southeastern New York State. Paleogeography, Paleoclimatology, Paleoecology 353-355: 45-59.

Millis, Tracy L., and Heather Millis 
Moffett, Ross

Moore, Susan Turner

Mrozowski, Stephen, A.

Mulholland, Mitchell T.

Nadeau, Jaclyn and Nicholas F. Bellantoni

Newby, Paige E., Bryan N. Shuman, Jeffrey P. Donnelly, Kristopher B. Karnauskas, and Jeremiah Marsicek

Newby, Paige E., Bryan N. Shuman, Jeffrey P. Donnelly, Dana MacDonald
2011 Repeated century-scale droughts over the past 13,000 years near the Hudson River watershed, USA. *Quaternary Research* 75: 523-530.

Nydick, Koren R., Alison B. Bidwell, Ellen Thomas, Johan C. Varekamp

Oldale, Robert N.

Oldale, R.N., and C. J. O’hara
1980 New radiocarbon dates from the inner continental shelf off southeastern Massachusetts and a local sea-level-rise curve for the past 12,000 years. *Geology* 8: 102-106.

Orson, Richard A., R. Scott Warren, William A. Niering

Oswald, W.W., D.R. Foster, E.D. Doughty, and D. Macdonald

Oswald, Wyatt W., and David R. Foster

Pagoulatos, Peter

Patton, Peter C., and Gregory S. Horne


Perlman, Stephen M.

Petersen, James B.
1980  The Middle Woodland Ceramics of the Winooksi Site AD 1-1000. *New Series, Monograph No. 1, Vermont Archaeological Society*


Petersen, James B., and Nathan D. Hamilton

Pope, G. P.

Raab, L.M.,
Rae, Brianna and Brian Jones

Reith, Christina B.


Ritchie, Duncan


Ritchie, William A.


Ritchie, William A., and Richard S. MacNeish

Robinson, Francis “Jess” W.

Rouse, Irving

Sanger, David


Schambach, Frank and Howard L. Bailet

Schriever, Bernard A., Matthew Taliaferro, and Barbara J. Roth

Shaw, Leslie


Shea, John J.

Shuman, Bryan N., and Sara A. Burrell
Singer, Zachary L. F.

Skibo, James M. and Michael B. Schiffer

Smith, Caryle

Smith, C.B., Ebert, C.E., and Kennett, D.J.

Snow, Dean

Spiess, Arthur

Staats, F. Dayton

Starbuck, David R.

Stewart, R. Michael

Strauss, Alan E.


Strauss, Alan E., and Daniel P. Murray

Taché, Karine

Taché, Karine, Adrian Burke, and Oliver E. Craig
2017  From Molecules to Clay Pot Cooking at the Archaic-Woodland Transition: A Glimpse from Two Sites in the Middle St. Lawrence Valley, QC. *Canadian Journal of Archaeology* 41: 212-237.

Taché, Karine, and Oliver E. Craig

Thakar, H.B.

Thomas, David Hurst

Thomas, Kenneth D.

Thomas, Frank R.

Tite, M.S, V. Klikoglou, and G. Vekinis

Towle, Linda

Tryon, Christian A., and Anthony Philpotts

Tuck, James A.

Viau, A.E., K. Gajewski, M. C. Sawada, and P. Fines

van de Plassche, O., W.G. Mook, and A. L. Bloom

Versaggi, Nina M.

Waller, Joseph N.

Wanner, Heinz, Olga Solomina, Martin Grosjean, Stefan P. Ritz, and Markéta Jetel

Wasselkov, G. A.

Whitaker, A.R., Byrd, B.F.
2014  Social circumscription, Territoriality, and the Late Holocene intensification of small-bodied shellfish along the California Coast. *Journal of Island and Coastal Archaeology* 9: 150-168.

Winterhalder, Bruce

Winterhalder, Bruce and E.A. Smith

Wray, Charles F.

Zangrando, A.F., Vargas, G.P., Tivoli, A.M
2017 Decreased foraging return in shellfishing? Species composition and shell size of blue mussel (*Mytilus edulis*) from a Late Holocene site of the South Coast of Tierra del Fuego. *Quaternary International* 427: 160-169.