

Coastal Pre-History – Ecological Questions and Issues

Modified from March 29, 2005

“History and especially prehistory is not given to us – we must earn it by diligent, imaginative, respectful, and honest inquiry into the remains available to us”. Dincauze 1990.

The intent here is to frame questions and outline observations from my own reading on Indian activities before and through the periods of European settlement that are pertinent to major issues in ecological and conservation interpretation and practice. Our ultimate goal is to interpret the structure and dynamics of the landscape and environment and use this to inform current management practices in conservation. Thus, interpreting the direct and indirect effects of humans on both is critical. However, it is clearly necessary and interesting to understand more broadly the nature of and changes in human cultural and subsistence practices over this period. Although the material below is loosely organized by topic there is no particular hierarchy or flow to this organization.

In many ways the basic issue comes down to what Dina Dincauze identified as the **Basic overarching question** in her 1980 paper – what was the land tenure, resource utilization, population structure and population size of Indian groups and how did this change. What I would add is how did these translate into direct (e.g., forest clearing, burning) and indirect (e.g., hunting or land-use impacts on vegetation that result in increases or reductions in particular wildlife species) drivers of landscape conditions and changes?

Context – Some ecological and conservation interpretations of Indian impacts

The reason that we are interested in Indian activities is that people have clearly always been important drivers of landscape conditions and changes. However, the nature of these impacts and the scale and intensity at which Indians managed their landscape is highly debated and has changed markedly in the last four decades. These interpretations are important because many individuals and groups use the pre-European period as a baseline or target for current management or as a reference against which they interpret modern conditions.

Here is a sample of some examples of this.

1. State of Connecticut Division of Forestry Information Sign (direct transcription)

Native American Use of Prescribed Fire

Native Americans burned extensive portions of the forest every 1 to 3 years in order to make the forest habitable. The grassy understory which followed the fires provided improved forage for game animals such as deer and turkey. Travel became easier and the increased visibility aided in defense. Forests with thick woody understories, so prevalent today, were limited “to swamps and areas temporarily uninhabited by Native Americans”.

The Connecticut Division of Forestry is utilizing controlled fires at this site to replicate the effect that the Native American fires had on the forest. The goal is to restore the forest to a semblance of that of the pre-colonial era. Repeated controlled fires will be used to replace the woody understory with a herbaceous one similar to that found when the Europeans first settled New England.

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2. Interpretation and Management of Sand Plain Ecosystems

<http://www.umass.edu/nrc/nebarrensfuels/index.html>

(Patterson and Crary – UMass and National Park Service)

“Lightning-caused fires are rare on Cape Cod, but even before Europeans arrived in the 17th century, Native American Indians used fire for a variety of purposes including clearing away underbrush, promote berry production for their own use and to increase food for wildlife. After the Pilgrims arrived wildfires have been widespread on the outer Cape until the last half of the 20th century have been more successful.” (sic)

“Prior to acquisition by the National Park Service in 1961, the Lombard/Paradise area had been logged and grazed, but not cultivated. Over the last 100 years the forest has experienced gypsy moth defoliation every 20-30 years, most recently in the early-mid 1980's.

Decades of fire suppression altered historic fire cycles and allowed wildland fuels to accumulate, again raising the threat of wildfires which could threaten cottages within the Seashore boundaries.”

“In 1986, the National Park Service in cooperation with the University of Massachusetts/Amherst initiated applied research on the effectiveness of varying season and frequency of treatments on forest composition, fuel loading, and fire behavior...”

Montague Sand Plain – “The primary purpose of the site is to protect and preserve an outstanding example of a xeric (dry) outwash pitch pine-scrub oak barren natural community, its associated biota and its ecological processes.

Paleoecological evidence strongly suggests fire was a common occurrence on the Montague Plains from 500 to at least 2,000 years before European settlement. Throughout North America, prehistoric Native Americans used fire as a landscape management tool to increase browse and mast for game species, drive game, increase production in certain food-bearing plants, ease travel through the wilderness by clearing

underbrush, communicate among groups, facilitate effective defense of their communities and territories, and, once agriculture was adopted, to clear and fertilize crop lands. Fires have occurred in every month of the year on the Plains, but are most frequent in April and May. This pattern is consistent with the fact that the lowest average relative humidities in the region occur in April and May, that leaf-out of deciduous species on the Plains has not occurred leading to very low fuel moisture conditions, and that this period corresponds with the Massachusetts legal open burning season.”

3. Denevan (1992) *The pristine Myth: The Landscape of the Americas in 1492*

Describing New England, the Midwest and the southeast - “Agricultural clearing and burning had converted much of the forest into successional (fallow) ground and into semi-permanent grassy openings (meadows, barrens, plains, glades, savannas, and prairies)”.

Some Basic Questions Raised in my Mind from a Reading of the Archaeological, Historical and Ecological Literature

What was the population size and distribution at various spatial scales?

Are the basic estimates of Cook, Whitney etc. worth using? Do we believe the existing numbers and differences within our region? e.g., for MV, ACK, E LI and the Cape?

Lots of numbers to pick from but some I’m not sure that the range isn’t pretty consistent. Within the coastal area there seems to be some consistent agreement regarding regional variations in the relative densities of people, e.g., lower on the Cape, much higher on MV and ACK.

James Mooney: 5 NE states – 22,100; LI and NY E of Hudson – 12,000
Cook – family 4.6 people; village 100-250, etc.

Gookin 72,000 pre-epidemic; Snow adds 8000 for the Potumtucks and 13,000 for LI and E of Hudson.

Willoughby (1935) – 24,000
Russell (1980) – 75,000
Cronon (1982) 70 – 100,000

Decline due to disease was 55% (Snow 1980) to 75% (Cook 1973).

Bragdon - 1650 estimates that Indian population had dropped to 10% and European population of NE was 18,500

Starna – Pequots declined from 13,000 before contact to 3000 in 1636 due to 1633 small pox killing 55-75%. (1616-1619 disease didn't extend W or S of Narragansett Bay).

Snow and Lamphear (1988) – estimates of population decline from disease. 1616 – yellow fever, trichinosis, bubonic plague

Nausets 12 before epidemics; possibly 2100 on entire Cape (DD 10.28.04)

Wampanoags – SE Mass from Cape base to East above Plymouth and W to E shore of Narragansett Bay – 4-5000 people before devastating impacts of 1617-19 disease.

ACK 2-3000 people at Contact (DD 1.26.05)

More importantly – how were these people distributed across the landscape?

Many of the more recent (last couple of decades) archaeological studies and some of the ethnohistoric materials suggest that groups were fairly mobile and plastic before European contact, moving and varying in size and composition seasonally, exhibiting great ability to disperse rapidly from what were really temporary encampments, and varying in size from small family groups to “villages” of up to 200 people. The permanence or ongoing re-use of particular sites, the size of groups, and the changing subsistence base are obviously all of great interest as they would largely determine the types and intensities of ecological impacts on the landscape. For example, the depletion of wood resources, the clearing of forest for horticulture and settlement purposes, hunting and other forms of gathering, etc.

Various materials.

Brendremer (1993) lexicon: task-specific camp (10-100 m²), temporary camp (100-500 m²), seasonal camp (750-2000 m²), village (3 – 10,000 m²); each differs in size, artifacts, duration, seasonal timing, and range of activities.

Numerous archaeological studies find evidence for house structures: wigwams (14-25' diameter with post holes 3-7" diameter (DD 7.02.04); Shinnecock Hill, LI – 2 structures 15x20' 3' deep and 10x15' and 2' deep with center fire places (DD 7.02.04); MV – 17' diameter house rings with a ridge of earth (DD 12.24.04) and random to haphazard small post holes suggesting repeated use by temporary housing. Lucy Vincent 130 post molds, 31 pits (Chilton; DD12.24.04). ACK – evidence of large main posts (DD 1.26.05) Herrecater site – 14 pits and 26 post holes. Milford CT 100' diameter shelter with maize and 150 burials, many of which are children (DD 5.14.04; Postcontact?). Few reports of long houses, i.e., very large structures or very large post holes.

Major sites on MV (Head of Lagoon Pd, Shores of Menemsha and Nashaquitsa Ponds apparently exhibit uninterrupted native occupation over 1000s of years. (DD

12.24.04). In general, almost every pond, watercourse and estuary on the island show evidence of people over 1000s of years.

Size of shell middens is strong indication of repeated use – Old Lyme – heap extends 800 feet along shore and ranges from 8 to 100 feet wide.

Pequots - Dispersed and shifting distribution of 10-20 house small villages (Starna 1990)

But - Conditional sedentism (Bragdon 1996) with seasonal mobility. Summer near coast, winter in more concentrated populations inlands. Spring/fall dispersed small groups.

What tools were available for manipulating the land, vegetation or water and what motivation would natives have had to undertake this manipulation?

While many conservationists believe that large areas may have been cleared by natives it is not always clear exactly why or how they would do this. The Patterson and State of CT examples cited above provide many possible motivations, but it is not at all clear that all are valid. E.g., in the apparent absence of significant inter-group hostilities the clearing for defense seems weak. For mobile groups some of the others seem questionable also. Critically addressing this with the archaeological and historical materials at hand (rather than citing secondary sources like Cronon etc.) seems like a useful and important activity.

It also seems important to expand the consideration of the ecological impacts of people far beyond just the simple question of whether they cleared areas and burned forests. Since they survived on a complex subsistence base and patterns that effectively utilized the full array of habitats and ecological zones available there impact, though subtle extended well beyond certain direct effects. Hunting, plant (fruit, nut, grass, grain) harvesting, shellfish collection and fishing, encouragement/cultivation of particular useful plants (and animals), wood and stone collection, etc.

We have the early descriptions by John Smith and others of Indians cutting trees and burning areas to clear them, planting among the dead trees, etc. but certainly no descriptions of Indians actively clearing anything large. One could imagine that progressive use of wood, clearing for small fields, and burning could eventually have produced large openings but we don't have much evidence that this happened, let alone would have been desirable from a native perspective. Bragdon (1996) estimates 1500 acres of land cleared for horticulture along the coast per large community (?). Not sure where she pulled this from.

Less obvious tools/practices – e.g., planting or favoring of nut trees (Bragdon 1996).

Russell (1983) - Day (1953) cautioned that burning only occurred in sites inhabited by Indians. Few first hand accounts of fire. Most of these take place in grass and weeds.

Salwen (1973) – deer possibly comprise 90% of the meat consumed in S CT. Apparent tremendous emphasis on white tail deer. Humans probably the major predator of deer. (Important conservation and ecological message for today). Cited by DD for MV, ACK, Narragansett Bay, NY, etc.

Related to all of this – how rapidly did they adopt European tools and materials? The literature is all over the place on this – ranging from statements that iron tools (points, knives, hatchets, etc.) were extensively used by the time of initial settlement (Long Island - Strong 1977) to estimates that this may not have really begun until the mid 17th C.

Was horticulture based on permanent field and short fallow as opposed to true slash and burn?

I am not sure that this is a critical question but it is interesting one that Doolittle has been raising for years and just wrote an interesting review on using good ethnohistorical sources. This subject demands a certain rigor in terminology – e.g., many ecologists and conservationists use the term “slash and burn” casually to indicate any burning in a fallow system of agriculture rather than in the restrictive sense of burning in resprouting woody vegetation.

Doolittle (1992, 2004) - no evidence of true milpa-style slash and burn agriculture. Trees and woody vegetation completely removed from fields and fields were maintained for lengthy periods. Burning and hoeing occurred in preparation for planting, but this involved removing grassy and weedy vegetation, not resprouting trees, vines and shrubs as in Central America today. He cites Wm Wood – fields in crops for 10 years and Roger Williams – Indian term for “fields worn out”. Fertility was presumably maintained by intercropping and rotating with beans.

Champlain 1605 at Boston Bay “there were also several fields entirely uncultivated, the land being allowed to remain fallow. When they wished to plant it, they set fire to the weeds, and then work it over with their wooden spades”.

Patterson and Sassmann (1988) – describe a shifting slash and burn agriculture. They describe fire most advantageous to a stationary agricultural land use (also Cronon 1982). [This type of interpretation, if true, is one reason that it is important to know whether permanent or semi-permanent villages occurred in association with horticulture. This may just be a casual use of “slash and burn”]. Patterson and Sassaman (1988) - Maize agriculture more important along coast than inland or along rivers. [I don't see that other archaeologists still believe this].

This, of course raises the entire question of the importance of horticulture and maize.

Arrival of maize to New England was a non-event (Dincauze 1990, Chilton 1999). Appearance of maize does not equal reliance on farming (Luedtke 1988). When the English destroyed native cornfields apparently they anticipated that this would cripple the Indians – it didn't due to broad spectrum of foods, proving that maize was not a critical staple (Strong 1997).

Broad spectrum hunting fishing, gathering with supplemental horticulture. (Carlson et al. 1992, Dincauze 1990, Chilton 1999, 2000, Strong 1997)

Striking in the reports from Deena – although there are precious few reports of maize finds (and these usually involve single or just a few maize kernels or a cob), many of the reports and interpretation suggest that horticulture was supplemental or important. Why is there this disjunct between archaeological finds and interpretation? (All of the various reasons that evidence of horticulture might be lacking, overlooked, or destroyed?).

W (NW?) side Menemsha Pd – cornfield with 50 hills and very black soil with bones and shells, presumed by Guernsey to be aboriginal – but was this prehistoric? (DD 12.24.04)

Is it reasonable to interpret much of what we read from historical descriptions as representing changing subsistence, settlement and cultural practices arising from the many impacts of contact that occurred over a prolonged period before settlement?

Does this explanation reconcile many of the differences between the historical document record and the archaeological record?

While many people do not go as far as Ceci in ascribing the practices described historically to contact there does seem to be a tension between the notion that many native cultural practices were enduring through contact and the historical period and the thought that there was tremendous social upheaval as a result of disease, trading and economic opportunities, and conflict resulting from European presence. Many authors seem to suggest that the following kinds of changes occurred as a result of progressive influence of European goods, trade, conflict, etc.: development of a more formal tribal or large group organization (Strong 1997); increased sedentism and year-round villages (Thorbahn 1988, Ceci 1980, Strong 1997, Chilton 1999); increase in maize horticulture both for trading and subsistence (Ceci 1980, Chilton 1999); increased trade (Ceci 1980, Chilton 1999); increased hostilities among native groups; development of fortified villages located in defensible sites (Strong 1997); increased risk of disease with more concentrated and larger populations (and obvious exposure to new diseases through contact with Europeans, especially European children); concentration of villages at the coast and in harbors and bays used by Europeans (Strong 1997); increase in centralized (individual leader) power (Ceci 1980, Strong 1997); increased group and village sizes

(Ceci 1980, Dincauze 1990); a progressive decline in the availability of native wild foods due to European presence (Strong 1997); and realignment of existing native group dynamics (Pagoulatos 1988, Dincauze 1990, Bragdon 1996, Strong 1997, Chilton 2000 – this remains a major question). These are obviously interconnected in complex ways.

Relevant Bits and Pieces

Some people describe no evidence for permanent villages before contact (Strong 1997). In others minds historical documents are consistent with an absence of a nucleated pattern of settlement; the term “town” used loosely (Luedtke 1988).

Defeat of Pequots 1636-1638 left a power vacuum (Strong 1997).

McBride 1990 – Pre-contact sites show little evidence of being selected or constructed for defense. After contact the development of fortified villages on hilltops occurred. Sites like Fort Hill and Mystic Fort were also different from Precontact sites due to the large number of wigwams (70 vs <30 in nonfortified sites; DD 5.14.04) Roger Williams describes the Pequots establishing new cornfields on LI and possibly Fisher’s Island in preparation for war and the anticipation of CT fields being destroyed. On Long Island Fort Massapeag (mid 17th C) and Fort Corchaug (1635-40, 1660-65) appear to be clearly associated with European Contact.

Bragdon (1996) has a good discussion of the different origins, geographical coverage and perspectives of the various European writers at the time of settlement. She and Brendremer (1993) interpret the increase in political centralization as occurring before European contact due to population increase, increase in reliance on maize, increased influence of Hopewellian culture and the gradual filtering in of European trade goods from 1500 onwards.

Notes on Bias in Ethnohistorical Materials

Reasons for European bias in their writing and reporting – (1) explorers and settlers couldn’t read the landscape and cultural activities as the practices were all foreign and the much wilder state of nature was completely unfamiliar to them (Dincauze 1990, Strong 1997); (2) propaganda, bragging, and specific agendas for reports back home (Russell 1988, Strong 1997), (3) explicit instructions to report back on economic potential including soil fertility, timber, etc., led to exaggeration or a single-minded focus that overemphasize the actual importance of particular features or activities. E.g., reports may have given undue focus on maize agriculture due to the European interest in documenting the perceived fertility of the region. This, in term led to the assumption that farming was a central subsistence activity (Bragdon 1996), (4) climate/environmental (as well as cultural) change coincided with European exploration and settlement (Dincauze 1990), (5) Explorers and settlers needed to justify the taking of land and mistreatment of natives (Strong 1997).

Pagoulatos (1988) – Roger Williams is a traditional source of great insight into native customs but his observations date to late 1630s after native systems were already drastically changes by epidemics, wampum, fur trade, and hostilities.

Dincauze (1990) – Don't accept English and Dutch narratives on horticulture, the reliance of the population on maize, or the hostilities among native groups as representative of earlier times. Resist the temptation to read the archaeological record in terms of the historical records as there are few historical accounts and they contain extreme biases.

Arguments for Late Woodland Cultural Shift Independent of Contact

Numerous studies suggest that there were changes in population size and distribution and subsistence patterns in the Late Woodland period and that these represent adaptations to environmental changes or influences of outside (native) cultures through increased trade, etc. [All of this is made problematical by the fact that Contact seems to be defined solely by the presence of European goods. In the absence of such materials, sites are deemed “pre-Contact”. And even when there is a mixture of materials some studies apparently ascribe that to “mixing”. Some authors (e.g., Loparto et al. 1987 see a continuity of sites and practices from LW to CP, emphasize that there is little material change across this horizon, and so downplay the whole thing]. Basically the Contact Period appears to remain as poorly understood in our region and across SNE.

Dunford (in Little 1988, as summarized by DD 2003), describes a decline in shellfish production from A.D. 1000-1300 that he ascribes to overuse and increased runoff of freshwater. This is followed by increased intensification of agriculture around A.D. 1500 (evidence?) representing a fundamental shift to a dispersed single-family “farmstead pattern” (his term) along estuaries. This might be what Champlain documented: scattered wigwams with corn, beans, squash, tobacco, fallow land, burning of weeds, etc. Or perhaps what Champlain documented were actually temporary and easily disbanded. Or he may have documented something more permanent but triggered by direct and indirect effects on contact (see contact timeline at end).

Other studies suggest that a shift in shellfish use on Cape Cod from year-round to primarily winter and early spring may represent an adaptation to horticultural activity during the summer (but little evidence? MacManamon 1984 a,b; DD 10.28.04)

Other explanations (from DD 2003) for increased number of LW sites (and population): (1) long-term influence of the development of pottery (beginning about 3000 BP), led to increased use of gruel (seeds, nuts) for weaning, which in turn allowed earlier weaning and an increase in fecundity; or (2) A.D. 1000 climate amelioration including a longer growing season and warmer temperatures resulted in increased productivity, which in turn allowed more sedentary lifestyle and a transition to increased horticulture. With Little Ice Age deterioration in climate horticulture might have intensified to cope.

Does the coast represent a distinct cultural region?

With access to the unique maritime resources and given the distinctive environment and vegetation of the coastal region it is easy to believe that there might be a suite of unique adaptations, cultural practices and ecologically important activities characteristic of coastal peoples. (In fact this is difficult to deny). But archaeologists seem to differ widely on this subject, from Ritchie's (1969) declaration that there is no such thing as a discrete or uniform coastal culture, to the old coastal/inland dichotomy, to Bragdon's (1996) tripartite interpretation (coast, upland, river) to Brendremer's (1993) even more fine-grained sub-regional differentiation. Chilton (2000) – finds the tripartite model refreshing but still too coarse grained. Presumably there was a continuum in activity across southern New England, but can we or should we see our coastal region as standing out? If so, how, and what difference does this make ecologically?

Related to this – how extensive was trade, interaction, movement and sharing of materials across eastern North America and up and down the coast? A coastal location would clearly appear to facilitate both trade and more extensive occurrence of interactions with foreign groups (ultimately including the very earliest contacts with Europeans). Did extensive trade among Indian groups facilitate the long distance passage of European materials down the coast? For example, when European explorers documented Indians off of Maine wearing Spanish clothes, using a Basque-like boat, and speaking with some European words how much of this was derived from direct contact and how much through trade?

Do the coastal people stand out because of their earlier and much stronger exposure to European influences? Isn't there the possibility that they may have begun changing under the influence of European encounters (direct and indirect) many hundreds of years before inland groups? Is this important?

If the coast is distinctive how much intraregional variation was there?

According to Chilton (1999, cited in DD 2003) New England archaeologists argue that there may be more variation within the subregions of New England than there are between them. Strong (1997), Starna (1990) and others identify the Eastern Long Island groups as closely tied to those in CT, Rhode Island, and even the Cape and Islands and less closely related to the Western Long Island and NY-NJ groups. E.g., Starna identifies

the Pequots as extending from E Long Island and New London area north to the Thames and Connecticut Rivers to the border of Rhode Island. What is the nature of these distinctions and how much variation do we see within our region? Are these differences of use (e.g., some of the smaller islands may not have supported year-round settlement so may have experienced different impacts, etc.) or are they intraregional cultural differences?

DD (7.02.04) – overall coastal NY is quite similar to other coastal New England areas. Adaptation to estuaries, use of semi-permanent dispersed settlements, and diverse subsistence base that involved little evidence of maize.

DD (12.24.04) – MV similar pattern of temporal changes in population size to SNE, except relatively more Woodland sites.

Do we need to look at Maine or the NY-Canadian long house groups before we see really different patterns?

Variation in Disease – early impact (1617-19) East of Narragansett Bay on mainland; Narragansett Bay to W hit later as was MV and ACK. Latter due to relatively late settlement – MV 1642; ACK - 1659.

PALEO-ARCHAEO NSF PROPOSAL 2011

Archaeology Overview and Hypotheses/Questions

Various environmental attributes contribute to an understanding of the archaeological record by providing important data about site selection patterns, available natural resources, and changes to the landscape over time, while the cultural context provides a framework within which to develop predictive settlement models and interpret identified archaeological resources. While broadly applied models have been applied to all of the Northeastern United States, thus suggesting the same patterns of site location and site function should exist across the board, it is evident that pre-contact peoples were choosing specific environments within which to live and exploit at different times during the pre-contact period. To explore the hypotheses that sub-regional variation shaped the archaeological landscape and is evident in the paleoenvironmental record, three subareas have been chosen to examine the relationship between people and their environment and whether or not their adaptive strategies, such as manipulating the landscape through burning, can be observed within microenvironments. These are all unique environments in Massachusetts that contain extensive records for archaeological sites: the Taunton River Drainage Basin (TRDB)—a coastal inland in southeastern Massachusetts, Martha's Vineyard (MV)—an island for the past 6000 years off the southeastern coast, and the Deerfield River Valley—a riverine inland. Compellingly diverse, both ecologically and archaeologically, an examination of these three areas will result in a breakdown and refinement of the expansive paleoenvironmental model usually applied when placing people on the landscape throughout the pre-contact period (ca. 10,000 to 450 B.P.). By effectively integrating the dynamic environmental and ecological data with the archaeological data of each of these diverse subareas with the broader regional context of Massachusetts, there will finally be an interpretation of cultural dynamics that is relevant, as opposed to a generalized interpretation of the entire Northeastern United States. The research will facilitate in answering major questions that remain concerning the relative importance of

climate, natural disturbance and human activity in controlling vegetation structure, composition and dynamics.

There is a rich and connected history of Native occupation within all of three of these subareas that affords closer examination, and a multidisciplinary approach to understanding the uniqueness of cultures within microenvironments should be applied. The first step in identifying the cultures within these subregions involves examining the attributes of the landscapes on which these sites are generally found, including the physical as well as the cultural aspects, on a site level. The second step involves looking beyond the already established cultural development to determine site function and human response and affect on the landscape, and finally, a clear picture needs to be painted of one local region, in order to compare it to other regions. Sub-regional comparisons are important for recognizing cultural similarities and cultural continuities, as well as the differences among people living in slightly different environments and within different cultural groups: they are a way to track the movement of peoples and traditions across landscapes, as opposed to assigning general cultural traits to broad regions (Doucette 2003).

TAUNTON RIVER DRAINAGE BASIN

Excerpted from *An Atlas of Massachusetts River Systems*:

The Taunton River Basin is the second largest drainage area in Massachusetts. The river has one of the flattest courses in the state with only a twenty foot difference along the forty mile length of the main stem. Its level terrain creates extensive wetlands throughout the basin, including the 16,950 acre Hockomock Swamp, one of the largest wetlands in New England (and also the source for many uncommon and rare species in this part of the state). Saltwater intrusion occurs as far as twelve miles upstream (the confluence with the Three Mile River) with tidal changes noticeable eighteen miles upstream (as far as Route 44). These conditions influence vegetation and wildlife along the river. The Taunton remains fairly uniform in width within its freshwater portion, then broadens into an estuary (downstream of the Berkley Bridge). Its watershed is notable for the myriad of small tributaries throughout the Basin.

The network of streams and rivers comprising the Taunton River basin drains 562 square miles of the southeastern part of the Commonwealth of Massachusetts and is the second largest watershed in the state. The Taunton River begins in the town of Bridgewater, Massachusetts at the confluence of the Matfield and Town Rivers. The upper section of the river, the focus of this Wild and Scenic River Study, flows alongside the towns of Bridgewater, Halifax, Middleborough, Raynham, and Taunton. http://www.tauntonriver.org/studymap_large.htm One of the reasons that the river has been so overlooked by local communities is that the river separates the rural towns at their peripheral borders, dividing rather than uniting the communities. The river continues through urban areas in the City of Taunton. The lower reaches pass Berkley and Dighton, where the river gradually becomes more saline as it approaches the estuary of Mount Hope Bay.

Bickford, Walter E.

1990 *An Atlas of Massachusetts River Systems: Environmental Designs for the Future*. University of Massachusetts Press.

In general, the environmental context for the 11,000-year record of pre-contact activity in the Taunton River Drainage Basin (TRDB) has been compiled from several pollen core studies conducted over the past twenty years or so (Bradshaw et al. 1982; Simon 1991; R. Webb et al. 1993; Newby et al. 1994; Newby et al. 2000). Paleoenvironmental reconstruction of southeastern Massachusetts is becoming better understood as new information becomes available, yet there is a lack of microenvironmental data. The pollen data is significant because it suggests that the lower TRDB was rich in wetland resources almost continuously, and that the people occupying the vicinity would have had plenty of resources to sustain themselves over the course of the pre-Contact period. The data also indicate that while generalized information about climate and resources can be used to generally interpret the past physical landscape, microenvironmental conditions varied widely within the region. Questions revolve around how people manipulated their immediate landscape, and how the earlier development of the mast forests within the TRDB affected settlement and subsistence patterns.

The Taunton River drainage has long been a focal point of archaeological interest to both avocational and professional archaeologists. Locals with archaeological interests focused their efforts on fertile areas along river floodplains and ponds where artifacts are often exposed as a result of plowing, cultivation, sand removal for cranberry bogs, and lowering water tables. The study of pre-European Contact occupations in the Plymouth County area has been greatly assisted by contributions from the Massachusetts Archaeological Society (MAS), formed in 1939 by avocational archaeologists. Information collected from MAS members comprises a substantial portion of the existing regional database (Hoffman 1991; Mahlstedt 1985; Mahlstedt and Johnson 1992). In addition, several cultural resource management (CRM) surveys have been conducted in the area by professional archaeologists. One such survey tested whether pre-Contact settlement patterns in the TRDB could be viewed as core and periphery areas (Thorbahn 1984). Cores are areas where populations and activities (social and economic) are concentrated; peripheries are characterized by dispersed activities that tend to be associated with specific core areas. The results of the I-495/Taunton River survey conducted in the early 1980's indicated that the same general land use system, similar to the core-periphery model, was relatively stable throughout the 11,500 years of pre-Contact occupation in the drainage (Thorbahn 1984).

The TRDB, with its many tributaries, represents the most extensive drainage system in southeastern Massachusetts and was a significant core area of Native American settlement throughout the pre-contact period. Native American inhabitants would have found it an ideal place for harvesting terrestrial and vegetative resources offered by the extensive wetlands and tributary streams and rivers. Anadromous fish traveled up these waterways, making the large ponds a major focal point of pre-contact settlement. The area is also very accessible, and served as a prime corridor for travel and communication between coastal and inland areas. The favorable setting of the TRDB is supported by the presence of hundreds of documented pre-contact Native American archaeological sites. The Native American presence in the TRDB has been documented from the PaleoIndian (ca. 11,500–10,000 B.P.) through the Late Woodland (1000–450 B.P.) periods. There is also a substantial record of occupation during the Contact and post-Contact periods, which continued into the twentieth century. Perhaps the most striking feature of the pre-contact record of the TRDB is the strong presence of the Early Archaic through later Archaic cultural materials. Sites in this area such as Titicut, Seaver Farm, Annasnappet Pond, and Wapanucket represent some of the largest known assemblages of Early Archaic, Middle Archaic, and Late Archaic materials ever found in New England (Robbins 1967; Dodge 1962; Doucette and Cross 1997; Doucette 2003; Robbins and Agogino 1964; Robbins 1980; Robinson 1996).

Sites have been identified within the TRDB containing PaleoIndian components, as well as later Archaic components. A PaleoIndian component has been documented at the Wapanucket Locus 8 site on the shores of Assawompsett Pond in Middleborough (Robbins 1980). At Wampanucket, more than ten fluted points, several scrapers and diagnostic gravers made of chert and red jasper were recovered on a knoll within the multicomponent site (Robbins and Agogino 1964; Robbins 1980). Find spots of single projectile points have been located in Carver, Wrentham, Mansfield, Bridgewater, and elsewhere in southeastern Massachusetts.

The Early Archaic Period (10,000–8000 B.P.) is characterized by a gradually warmer and drier climate, referred to as the Hypsithermal Period. This environment was dominated by a mixed pine-hardwood forest and would have made seasonally available food resources more predictable and abundant, allowing pre-contact period populations to exploit a wide range of territories. Megafauna populations began to be replaced by smaller game such as deer and bear. The lithic technology of the Early Archaic reflects a more diversified subsistence strategy, including beaked unifacial edge tools, cores, flakes, hammerstones, milling slabs, and notched pebble sinkers, indicating an increased utilization of plant and fish resources (Robinson 1992). Corner-notched, stemmed, and bifurcate-based points serve as the diagnostic artifact class for the period. Characteristic of both assemblage types is the predominance of expedient tools made from local lithic sources. There is an apparent concentration of Early Archaic sites in the upper reaches of the TRDB. A number of large multicomponent sites containing significantly high densities of bifurcate-base projectile points have been located within a 24-km (15 mile) stretch of the Taunton River in Carver, Middleborough and Bridgewater (Taylor 1976). Early Archaic Period groups may have returned to camps on a seasonal basis. Research has indicated that groups moved within established territories perhaps based on river and lake systems and other physiographic zones (Nicholas 1987; Tuck 1974).

The number of known Middle Archaic deposits (8,000-5,500 B.P.) in the TRDB is more than double that of the preceding Early Archaic. This increase is the result of a number of possible factors, including an actual increase in the number of sites and depositions as riverine resources (estuarine and anadromous fish) along coastal and inland areas were more intensively utilized. The distribution of Middle Archaic Period sites in the TRDB indicates that a multisite seasonal settlement system was firmly established by this time. Middle Archaic sites are generally found on high ground characterized by well-drained soils and in a wide variety of environmental settings including bogs, swamps, lakes, and ponds. Some of these sites appear to be large, repeatedly used base camps on riverine wetlands. Others are smaller, more temporary camps, while a third type is small loci containing specific tools for processing food or maintaining hunting equipment. The present-day seasonal migratory patterns of many bird and fish species had become established by the Middle Archaic Period (Dincauze 1974).

Excavations within the Annasnappet Pond Archaeological District in Carver yielded one of the largest collections of Middle Archaic artifacts in association with Middle Archaic radiocarbon dates in the northeast. Findings at Annasnappet Pond conclusively linked the emergence of atlatl weights to this period, and helped to refine the Middle Archaic tool kit and feature assemblage (Cross 1999; Doucette 2003; Doucette and Cross 1997). Ground-stone technology introduced a variety of tool types into the lithic assemblage including net sinkers, plummets, grooved adzes, axes, gouges, and atlatl weights (Dincauze 1976). The presence of adzes, gouges, and axes suggests heavy woodworking and possibly the appearance of dugout canoes.

Almost all sites in the TRDB yielding Early and Middle Archaic components also contain Late Archaic components (ca. 6000/5500-3000 BP), strongly suggesting an Archaic continuum. Pre-Contact sites affiliated with the Late Archaic cultural complexes show the greatest frequency and

widest distribution in different environmental zones than sites dating to any other pre-Contact time period (Doucette 2003). Cultural material and activities associated with the Late Archaic Period dominate sites in TRDB and occur here in greater numbers than in other sections of southeastern Massachusetts (MHC 1982a). The Late Archaic Period was marked by a climatic shift to drier and slightly warmer conditions with a significant decrease in precipitation. During this period, oak, pine, and beech reached their full extent, and wetlands became more abundant along river margins. Wetland and estuarine areas appear to have been used extensively based on site distribution. Perhaps in response to an increasingly resource-rich natural environment, Late Archaic populations expanded and diversified.

There is significant reuse of sites during the Woodland period (3000 to 450 BP) that had been occupied during the earlier Archaic periods. The reuse of several large Woodland sites along the Taunton River have been identified including the Titicut, Fort Hill, Taylor Farm, and Sever Farm, and Bassett Knoll sites (Harrison and McCormack 1990; Taylor 1969, 1971).

Known pre-contact sites with identified Early Woodland components (3,000-2,000 B.P.) are relatively scarce in comparison to the number of preceding Late Archaic sites and Middle Archaic sites. Early Woodland occupations generally have been identified on the basis of a few diagnostic projectile points and certain types of ceramics. In a study of pre-contact settlement processes within the TRDB, it was found that sites containing Middle and Late Woodland Period depositions are twice as numerous as those exhibiting Archaic cultural materials (Thorbahn et al. 1980:18). One probable explanation for the low density of known Early Woodland sites lies in the difficulty of recognizing them as such.

There appears to have been a definite shift in subsistence and settlement patterns during the Middle and Late Woodland periods, from an inland focus to a coastal one (Dincauze 1974). Larger base camps in riverine and coastal settings appear, and regional trade networks were established. There is an increased appearance of storage pit features suggesting increased production of bulk foods, a characteristic of sedentary settlement patterns. Artifact assemblages for this period comprise a high percentage of exotic lithic materials and speak to an expansion and elaboration of long-distance trade networks. Sites containing Middle Woodland Period (2,000-1,000 B.P.) components, while found in a variety of settings, tend to be concentrated along the coast in the lower reaches of the TRDB. Coastal/estuarine sites are frequently characterized by the presence of shell middens composed of lenses of dense black organic soil containing a variety of shells, artifacts, and occasionally human burials. Types of shell can include oyster, quahog, softshell clam, land snails, mussels, and whelk. Interior Middle Woodland sites are found next to rivers, ponds, and occasionally adjacent to small inland streams and wetlands. Large multicomponent riverine and pond zone sites include but are not limited to Titicut, Sever Farm, and Wapanucket. Radiocarbon dates from six pit features at the Bassett Knoll Site ranging in age from ca. 1360 to 1020 B.P., as well as diagnostic projectile points, provide evidence of a substantial Middle Woodland Period occupation at this site (Harrison and McCormack 1990).

Late Woodland Period sites (1,000-450 B.P.) are slightly more numerous than those of the Middle Woodland and, again, are located primarily near or on the coast in the lower reaches of the TRDB and characterized by the presence of shell middens. During this period, it appears that large groups of people often lived in one area, and some of these settlements took the form of fortified villages (MHC 1982a). There is also evidence that horticulture was established, although hunting and gathering was still an important part of the subsistence pattern. The Taunton River area a local core area of Late Woodland settlement and other activity.

The Weweantic sub-drainage is the location of many Woodland Period sites. In the Middleborough area, diagnostic Late Woodland artifacts have been recovered from a number of

sites such as the Indian Hill Site (19-PL-148) and the Fort Hill Field Site (19-PL-164) along the Taunton River. In addition, a number of large, multicomponent sites containing numerous lithic and ceramic artifacts and a wide diversity of features have been found in the Bridgewater, Middleborough, and Carver areas of the Taunton River drainage. These include the Ticut, Taylor Farm, Bassett Knoll, Seaver Farm, and Swan Hold sites (Dodge 1962; Fowler 1974; Harrison and McCormack 1990; Robbins 1967; Fowler 1976).

MARTHA'S VINEYARD

The configuration of Martha's Vineyard has changed significantly even since the retreat of the glaciers. Sea levels, low during the glacial period, gradually increased following glacial retreat resulting in the inundation of former shorelines and increasing the levels of fresh water in the groundwater supply, as well as in the ponds and rivers. For at least part of the pre-contact period, shorelines were much farther out than they are today. It is likely that an array of site types and locations have been destroyed by the rising sea levels on both the northern and southern shores of the island. By about 4,500 years ago sea levels stabilized and by 3,500 years ago the majority of marshes and swamps on the Cape had formed (Goudie 1977:169).

Background of the Archaeological Research

The pre-contact period history of Martha's Vineyard is fairly well due in part to a long record of professional and avocational archaeological investigation that has been focused on the island since the early part of the twentieth century. The earliest survey and excavation work on Martha's Vineyard was conducted in 1912 and 1913 by Samuel Guernsey and E.A. Hooten from Harvard's Peabody Museum. Their work was concentrated around the shores of Menemsha, Nashaquitsa, and the northern part of Squibnocket ponds. Eroded and excavated materials included stone and bone tools, pottery, shell midden deposits, and pit-shaped features. Two human burials were discovered at Pease's Point on the eastern shore of Menemsha Pond (Guernsey 1915).

Professional research continued in the 1930s with the work of Douglas Byers and Frederick Johnson. Sponsored by the R.S. Peabody Foundation in Andover, Massachusetts, the team excavated the Hornblower Shell Heap Site (19-DK-64) and the Squibnocket Cliff Shell Heap Site (19-DK-67) (Byers and Johnson 1940). Their detailed excavation techniques and analysis of recovered cultural material provided the first professional, scientific information about the archaeology of Martha's Vineyard. Excavations in the 1950s at the Norton Site near Vineyard Haven revealed information about pre-contact Native American populations spanning the Middle Archaic through Late Woodland and contact periods. E. Gale Huntington of the Dukes County Historical Society excavated a portion of the site that contained the earliest documented occupation on the island at the time (Huntington 1969).

William Ritchie's research and excavation in the 1960s added a great deal of information to the Vineyard's archaeological database. His research on six sites in Chilmark and Tisbury (including the Vincent Site) established the first chronological, cultural-historical framework for southeastern New England, as well as a model for human adaptation to marine resources (Ritchie 1969).

These earlier investigations focused primarily on the large ponds in the southwest portion of Chilmark; the shores of Squibnocket, Menemsha and Nashaquitsa ponds. The information collected by these researchers not only provided data for the study of the Native American land use on the island, but played a formative role in the evolution of archaeological research in the region as a whole.

More recent research on Martha's Vineyard has continued to focus on Native American use of the area through the study of site artifact collections (Anthony et al. 1980; Bouck et al. 1983; MHC 1987) and systematic excavation (Perlman 1976; Richardson 1983). A 1982 project sponsored by the MHC and the Carnegie Museum of Natural History examined more than 10,000 artifacts, and recorded 32 previously unknown sites (Bouck et al. 1983). This report provided new information about interior site locations and addressed the bias of earlier collectors to coastal shell midden sites.

In addition, more recent CRM surveys and professional excavations have collected archaeological data that provides new insight into coastal as well as upland, interior patterns of pre-contact settlement and land use on the northern and eastern ends of the island (Stachiw 1978; Chase 1980; Donta et al. 1993; Macpherson and Cherau 2002; Doucette and Chilton 2006; Herbster and Doucette 2006, 2008a, 2008b, 2008c, 2009; Doucette and Herbster 2008; Duffin and Herbster 2009; Herbster 2010; Herbster and Flynn 2011). Townwide archaeological surveys completed for all of the other Vineyard locales also provide important contexts within which to study the Vineyard's past (Mulholland et al. 1998, 1999a, 1999b; Herbster and Cherau 2000, 2002). An important component of these more recent projects has been a close collaboration between archaeologists and the island's present-day Wampanoag population, whose ancestors lived on the land over the entire period of human occupation.

During the PaleoIndian Period (12,000—10,000 B.P.), the 100 square miles that compose the present-day Martha's Vineyard island were one of the more elevated landforms on the continental shelf. The rivers and wetlands that would have been present could have attracted Native American populations. Until very recently, the earliest documented occupation of Martha's Vineyard was during the Late Archaic Period (6000-3000 B.P.). Recent studies of private artifact collections from the island (Bouck et al. 1983), along with the excavation and re-excavation of several sites by the Carnegie Museum of Natural History, have discovered evidence of possible PaleoIndian occupations.

One fluted and four unfluted points diagnostic of the PaleoIndian temporal period have been recognized in local artifact collections (Bouck et al. 1983). A single, possible waterworn fluted point may also have been recovered from the Norton Site (19-DK-20) near Vineyard Haven (Huntington 1969). Most recently, a possible late PaleoIndian Dalton-like projectile point was recovered within plowed soils at the multicomponent Lucy Vincent Beach Site (19-DK-148) on Chilmark Pond (Chilton and Doucette 2002). The apparent absence of early pre-contact period sites could reflect collector and archaeological survey biases toward more visible, coastal shell-midden features. These types of archaeological features are more readily identifiable eroding out of the embankments of coastal ponds and elevated sections of the shoreline.

Early Archaic Period (10,000 – 8000 B.P.) settlement on Martha's Vineyard is documented by the presence of diagnostic bifurcate base projectile points in local collections. Five bifurcate points have been recorded in island collections, although there are no known intact Early Archaic cultural components associated with these finds (Richardson, personal communication in MHC 1987). One of these points was found at the Norton Site, and another was collected from a location in Oak Bluffs, suggesting continuity in site location with the PaleoIndian Period. Early Archaic components have

also been identified at the Major's Cove (19-DK-81) and Felix Neck 4 (19-DK-98) sites near the Edgartown/Oak Bluffs town line and at the Tiasquam River Site (19-DK-6) in West Tisbury (MHC site files).

Several diagnostic bifurcate-based projectile points have been identified during CRM surveys in Aquinnah. These artifacts represent some of the first in situ deposits on the island dating to the earliest periods of human occupation and suggest that the interior woodlands were utilized by hunter-gatherer groups living nearby. An isolated bifurcate fragment was collected at the Saxifrax Knoll Site (19-DK-192), located in the interior uplands in the northeastern portion of Aquinnah (Herbster and Cherau 2001a). A bifurcate-based projectile point was also recovered from the multi-component East Pasture Site located near the southwestern shore of Menemsha Pond (Herbster 2004).

Evidence of Middle Archaic Period (8000–6000 B.P.) occupations has been identified through collections analyses at several site locations at the eastern side of Menemsha Pond and at Belden's Cove near the Chilmark-West Tisbury town line (MHC site files). CRM studies in interior portions of Aquinnah have recovered two diagnostic projectile points on Tribal Trust Lands, indicating a Middle Archaic Period occupation of this area (Glover and McBride 1992; Glover et al. 1994). Diagnostic artifacts were also recovered during excavation of a coastal site above Chilmark Pond (Chilton and Doucette 2002). Middle Archaic Period deposits were also collected at the East Pasture Site (Herbster 2004). While these artifacts, to date, have been recovered as isolated finds in Chilmark and Aquinnah, the identification of these styles from various environmental settings suggests that additional Middle Archaic Period depositions may be present at both coastal and interior locations on the island.

The Felix Neck 4 and Major's Cove sites in Edgartown are recorded as containing diagnostic Middle Archaic projectile points, along with diagnostic materials from later periods (MHC site files; Herbster and Cherau 2000). Eight sites in West Tisbury contain Middle Archaic components, including the Tiasquam River, Witch Brook, Mill Brook, Rainbow Farm, and Arrowhead Farm sites (Mulholland et al. 1999a). Middle Archaic tool types are present in assemblages collected by William Ritchie at the Pratt Site (19-DK-10) on Lagoon Pond and possibly at the Vincent Site. The multicomponent Head of the Lagoon Site (19-DK-115) that straddles the Tisbury/Oak Bluffs town line, also contained Middle Archaic deposits, as did the Duarte Pond Site (19-DK-78).

By the Late Archaic Period (6000–3000 B.P.) Martha's Vineyard was completely cut off from the mainland and had assumed its present shape, somewhat reducing the area within which local populations could subsist. Sites from this and the overlapping Transitional Period (3600 to 2500 B.P.) are well documented as a result of both collections analyses and excavation. While these sites have been identified all over the island, the majority of the Late Archaic through Woodland Period sites are located along ponds and the shoreline, where fishing and shellfish gathering would have taken place. Sites from these periods are often associated with shell midden deposits.

William Ritchie's Vineyard excavations (1969) produced the first archaeological evidence of Late Archaic Laurentian and Susquehanna cultural traditions in southern New England. Projectile points, diagnostic of the Laurentian tradition, have been located throughout the island, although not in large numbers. Many have been found in the lowest strata of coastal shell

middens, including the Vincent and Hornblower II sites along the shores of Lagoon Pond, and at Squibnocket Pond. Laurentian points have also been recovered in Aquinnah near the Herring Creek (Herbster and Cherau 1999) and in Chilmark at Lucy Vincent Beach (Chilton and Doucette 2002).

The Late Archaic Squibnocket or Small Stemmed Complex was initially documented by Ritchie (1969) based on excavations of these quartz tools around the shores of Squibnocket Pond. The prevalence of the Small Stemmed point type at sites across southern New England was long considered to represent an increase in population and a concurrent widespread utilization of all available ecozones by Native groups. While this may be true, more recent scholarship has also shown that Small Stemmed tool types were utilized throughout the Early and Middle Woodland periods and even into the Late Woodland (Lavin 1984).

Recent and ongoing professional archaeological investigations around Squibnocket and Menemsha ponds and artifact analyses of previously excavated sites appear to bear out this second scenario, at least with respect to Martha's Vineyard. Late Archaic-styled points fashioned of quartz are often the most common projectile recovered from sites that also contain Woodland Period deposits such as ceramics, and have been identified in features radiocarbon dated to that period (Halligan 2000; Herbster and Cherau 1999, 2001b). The excavations at the Gerhard Site on Menemsha Pond provided a unique opportunity to evaluate the presence of Small Stemmed points within Woodland Period deposits in this area. Small Stemmed and Small Stemmed-like points comprise nearly half of the total point assemblage, represented by 34 examples recovered at the site. Radiocarbon dating and depositional analysis support a Late Woodland Small Stemmed association at the Gerhard Site that may be applicable at other coastal New England sites (Herbster and Cherau 2003).

The emerging pattern seen at these coastal and near-interior sites suggests that the Small Stemmed and Squibnocket projectile types served as expedient, useful tools that could be readily fashioned from quartz, quartzite, and other volcanic beach cobbles. While they clearly are associated with the Late Archaic Period at some of these sites, their prevalence in Woodland features and lithic workshops ties them firmly into this temporal period as well.

Woodland Period (3000 to 450 B.P.) sites are the most prevalent cultural components represented in the Vineyard's archaeological record. This is particularly true for coastal areas, where previous excavation and collection concentrated on midden sites along the shores of coastal ponds including Squibnocket, Menemsha, Sengekontacket, and Lagoon. Several CRM surveys have also identified Woodland components at inland sites (Herbster and Glover 1993; Herbster and Cherau 2001b; Herbster and Doucette 2008c). Many Woodland sites on the Vineyard contain components associated with all three cultural periods (Early, Middle, and Late), indicating that sites were repeatedly used over time (MHC 1987). The six sites excavated by Ritchie (Hornblower II, Peterson, Pratt, Vincent, Howland I, and Cunningham) produced radiocarbon dates and/or diagnostic cultural materials of the Early, Middle and Late Woodland periods (Ritchie 1969).

Early Woodland (3000–2000 B.P.) components have been identified from at least 18 site locations on the island, four of which were excavated by Ritchie (Pratt, Peterson, Vincent, and Howland I sites). These sites were temporally defined by diagnostic projectile point types, radiocarbon dates, and Vinette I ceramics. Early Woodland deposits have been collected at seven sites in West Tisbury, most in locations that also contained Late Archaic Period deposits (Mulholland et al. 1999a).

Ritchie also documented Middle Woodland (2000–1000 B.P.) occupation at the Hornblower II, Peterson, Vincent, and Cunningham sites, where Jack’s Reef Corner-Notched and Pentagonal, Steubenville Stemmed, and Green projectile point types were recovered. The latter three sites contained features that were radiocarbon dated to this period (Ritchie 1969). Recovered materials and feature information indicate that hunting, fishing, and collecting activities continued to dominate the subsistence strategy, but an increased emphasis on shellfish harvesting is reflected in the numerous shell midden sites. In the two decades following Ritchie’s excavations, nearly 20 sites were identified and recorded as containing Middle Woodland Period artifact assemblages (MHC 1987). Middle Woodland deposits have been collected at six sites in West Tisbury, primarily along the shores of Tisbury Great Pond and along Mill Brook (Mulholland et al. 1999a).

The Late Woodland Period (1000–450 B.P.) in much of the Northeast region saw the aggregation of indigenous populations into large, complex villages. In New England, evidence suggests that settlements were on a more modest scale. Composed of extended family groups, communities may have moved seasonally from inland bases to coastal sites in order to exploit seasonally abundant resources. Large shell middens are frequently associated with Late Woodland occupations.

Late Woodland Period deposits on Martha’s Vineyard were located by Ritchie at the Hornblower II, Peterson, and Howland I sites along the shores of Squibnocket Pond in Chilmark (Ritchie 1969). These components were identified by radiocarbon dates, diagnostic ceramic styles, and large triangular Levanna type points. The presence of radiocarbon-dated corn kernels from the Hornblower II Site and associated corn production artifacts and tools indicates that horticulture, in some form, had been introduced into the island’s Late Woodland subsistence systems. These food sources probably became an important component in the diets of local populations along with the continued harvesting of shellfish and marine animals as well as terrestrial game. Late Woodland sites have been documented on the Vineyard at both coastal and interior locations. Seven Late Woodland Period sites have been documented in West Tisbury, and materials dating to this period have also been collected along the shores of Lagoon Pond (Mulholland et al. 1999a, 1999b).

Native/Euro-American interaction on the Vineyard during the Contact and Plantation Periods (A.D. 1500–1675) is not clearly documented. The eastern end of the island, particularly Edgartown, was the area of initial European settlement, with much of the rest of the island apparently left under Native control. Population estimates for this period vary widely, from as little as 1,500 to approximately double that number. In addition, the plague that swept through the indigenous population in 1616–1617 could have severely affected the Vineyard as it did the rest of southern New England.

At the time of the first permanent European settlement in 1641, the island of Martha’s Vineyard was divided into four Wampanoag sachemships. These consisted of, from east to west, Chappaquiddick, Nunnepog, Takemmy, and Aquinnah (Gay Head). The group of Native Americans occupying present-day Edgartown was under the leadership of Tewanquatuck, Sagamore of Nunne-pog or Nunpaug which means “fresh pond or water place” (Banks 1911). The present-day West Chop area was known as Nobnocket and based on archaeological sites dating to the Late Woodland Period was occupied by Native people on a year-round basis.

Wikipedia – MV

Martha's Vineyard and Nantucket, Wampanoags numbered about 700 until an unknown epidemic wiped out nearly all the Nantucket tribe. The last surviving Nantucket Wampanoag died in 1855. Wampanoags from the mainland and Cape Cod emigrated to Martha's Vineyard, but by the mid-19th century, only about 40 island tribal members full-blooded Native Americans. Under Bureau of Indian Affairs, the Wampanoags of Martha's Vineyard and mainland banded together in 1928 to become the loosely organized Wampanoag Nation. Designation allowed limited self government in tribal lands and precursor to eventual full recognition. Currently five bands of Wampanoags in Massachusetts, but only Vineyard Aquinnah group granted federal and state recognition as a Native American tribe. Status was approved in 1987 after years of petitioning the U.S. Congress.

Possible Boxes to include somewhere within our text.

Box 1 - Reconstructing Pre-historical Activity.

In general I think that it might be interesting to include a short description, as a separate box, outlining methodology in a graspable way for each section.

Outline of the approaches used in this study emphasizing the value of complementing research archaeology (data recovery excavations) with information from site examinations, intensive surveys, and ethnohistorical materials. Intensive surveys provide information on areas with few or no materials as well as the sites with rich material. Provide a broader base for developing site models and landscape distribution of activity and impacts.

For example – Buzzard’s Bay area. Relatively few site exams or data recoveries and so it has often been interpreted as a poorly settled region. But the large amount of material obtained from avocational collections indicates that it is an important core area of native settlement. Rich network of rivers and streams.

Box 2 – History of European Contact with North America before “Settlement”

From different sources cited at back that can be bolstered and verified.

A.D. 1000 – 1300 Norse to Newfoundland, Labrador, and possibly much wider. Norse Greenlanders continued to obtain timber from the Labrador coast until ca. 1347 (Brasser 1978).

1497 Cabot to Newfoundland – claimed it for England

1500, 1501, 1502 Gaspar Corte Reals trips to N NA (Newfoundland?); kidnapped 57 Indians and transported them to Portugal; described Indians as having a sword and earrings from Cabot

1500s (mid) - Basque fishing/whaling camps in Labrador; Red Hook, one of ten semi-permanent camps, held up to 900 people for the summers.

1520 - Spanish slave hunter raids South Carolina; 150 Indians shipped to the W Indies

1524 Verrazano into NY harbor, Narragansett Bay, Block Island. May have spent as much as 15 days in Newport Harbor.

1525 Spanish (Estevan Gomes) kidnapped 58 Indians near Newport RI; sold as slaves in Spain

By 1530 - Extensive summer fishing off NA coast Labrador to Nova Scotia at least; involved the English, Bretons, Normans, Basques, Portuguese

Ca. 1540 European emphasis switches from fish to fur and fish

1550 - 30 French ships to NA annually

1578 - 50 English, 150 French, 100 Spanish fisheries spread down to the New England coast

< 1600 Dutch camps established on Long Island

1602 Bartholomew Gosnold (Brereton) to Elizabeth Islands; describes Indians in Spanish coat, Basque boat and speaking Spanish and French words. 32 people including 12 or more planning to stay and settle. On coastal Maine (Cape Ann?) met 8 savages "in a Biscay shallop, with sail and oars...an iron grapple, and a kettle of copper". One was "apparalleled with a waistcoat and breeches of black serge, made after our sea fashion, hoes and shoes on his feet; all the rest (saving one that had a pair of breeches of blue cloth) were naked. They appeared to have dealt with "some Basques of St. John de Luc, and to understand much more than we". Named Cape Cod on their 15th day. Took in a young Indian armed with a bow and arrow and plates of copper hanging in his ears. They built a storehouse on Cuttyhunk but all left with a load of sassafras.

1603 (and 1606) Martin Pring spends 6 weeks at Plymouth harvesting sassafras. He arrived carrying Nahanda, the Pemaquid sagamore who had been captured earlier by Weymouth and transported to England. Pring's second trip was with Thomas Hanhan

1604 French fur trading post established at Sainte Croix, Maine. (French colony at Port Royal (Annapolis, Nova Scotia) 300 miles from Plymouth. Grist mill constructed in 1606)

>1605 – most voyages brought Indians along as guides and interpreters (Vaughan 1965)

1604 (1605, 1606) Champlain to Plymouth, Gloucester, Chatham, Nauset

1605 DeMonts visit to Cape Cod (Explorations and settlements. Appendix B)

1607 Maine colony at Sagadahoc (Kennebec) – George Popham; 120 English settlers and 2 of Weymouth's Indians; built "Fort Popham", houses, stockade and a storehouse that burned down with all of its supplies. The settlement failed as it was a poor site in a severe winter, they lacked supplies and were attacked by Indians leaving 13 dead, and their sponsor Sir John Popham died back in England. The first Indians they encountered spoke some French. Popham first landed on Monhegan Island carrying one of the five Wawanoc Indians captured by George Weymouth in 1605. This Indian quickly disappeared.

1607 Captain Savalet (France) reported to have already made 42 trips to Nova Scotia.

- 1608 Captain Edward Harlow captured natives around Martha's Vineyard
- 1609 Hudson's first contact with Algonquians at Sandy Hook, NJ; brief visit to the Cape (Salwen 1978), then up Hudson almost to Albany; Dutch described as operating trade as far east as Narragansett Bay.
- 1611 Cpts Harlow and Hobson to Cape and Islands (Davistown Museum www)
- 1612 Dutch trading post established near Albany
- 1613 Jesuit priests arrived to St. Savior (Mount Desert) as part of missions from Port Royal to the savages
- 1613 Champlain describes Isle of Sable having oxen and cows that Portugese brought "60 years earlier"
- 1614 Trading post established in the Connecticut River Valley
- 1614 John Smith Cape Cod to Penobscot Bay (1616 – Cape Blanc Map). Smith noted evidence of the French being there 6 weeks earlier (Davistown www)
- 1614 Squanto and 26 other natives kidnapped at Patuxet (Plymouth) by Capt. Thomas Huntwith John Smith; taken to Spain, London, Canada
- 1619 Capt Thos. Dermer describes vacant plantations after plague. Dermer dropped Squanto in Nahant and made peace with remaining Plymouth Indians.
- 1620 Pemaquid Chief Samoset greets Pilgrims with "welcome, Englishmen" (Davistown www. This is frequently cited – is it true?)

Davistown Museum www – Ancient Pemaquid
<http://www.davistownmuseum.org/TDMnativeAm.htm>

Possible Early Visitors to Monhegan Island

Joao Alvarez Fagundes (1520), Gomez (1525), Verrazano (1524), Diego Malanado (1540), Andre Therel (1556), Richard Whithorne (1575), M. Anthonia Parkhurst (1578), Simon Fernando (1577), Steven Ballinger (1580), Don Pedro Menendez de Aviles (1582), Sir Francis Drake (1586), Richard Strong (1593), Henry Hudson (1609), Samuel Annian (1610), Capt. Williams (1610-11), Ed Harlow (1611)

The farming and broader management practices of the New England Indian are seized by Krech in his purposefully provocative book *The Ecological Indian*. Starting with the Pleistocene extinction of megafauna which Paul Martin, Tim Flannery and others have linked to the arrival of humans in many different continents Krech sets out to demolish the myth of the Indian as a passive, respectful and ecological part of nature. After skewering Emil Haury, great southwestern archeologist for failing to mention that this group dug thousands of miles of canals that literally transformed the carrying capacity of the Phoenix region, he turns to the Northeast. Following a now familiar refrain he asks how we reconcile the Eden-like description of the New World and its Adam and Eve-like residents with the facts that they eked a life from Eden's very soil? This was a large but nutritionally stressed population raising a grain of remarkably low quality on poor land that they rapidly exhausted and consequently shifted endlessly about? Through deforestation, slash and burn, shifting agriculture and a relentless scouring of the mountains, hills and valleys for wood they denuded, razed, raped and pillaged the most unEden-like land. One clear demonstration of the magnitude of human modification was the remarkable array of unusual openland species that it supported and that suffered when Indian land use declined. In this instance Krech goes right to the Vineyard for this evidence as he claims that the heath hen went extinct because the scrub oak grasslands were no longer burned by Indian hands.

In a somewhat similar vein Charles Mann describes a humanized world, one that like Cronon he attributes largely to the cultural revolution initiated by agriculture. Beginning in a distant time and place with the Neolithic origin of agriculture in the Middle East he underscores its critical role in transforming and enculturating much of the globe. Glancing at the second origin in the Far East he shifts to the New World and its cored teosinte. Bringing it progressively to the Northeast he paints a common picture: agriculture widespread by AD 1000, large farming villages well established, and abundant resources available from the crazy quilt of ecological landscapes created by the interplay of natural variation, human agriculture and fire. The value of thus resources, the land and the stores of food were great enough to natives and Euros alike that these forced defensive palisades—fortifications and fortified villages to be common when the Pilgrims roamed the land.

Like Cronon, Mann views the Indians as foraging a new balance in nature, or an “ancient ecological regime.” And, in a similar vein to Cronon and Pyne he presents that destroying the Indians, by disease, war or other means, led to destruction of the ecosystems that they had created. In this view the deep dark forest that HDT walked and relished was novel, something no Indian had even seen. Like Pyne he proclaims that created wilderness and citing Cronon and Changes he argues that no wilderness had existed for thousands of years in New England. In a twist he represents that the Edenic conditions witnessed in the early 1600s was not due to the foresight and actions of Indians but to their disappearance. The passenger pigeon, deer, turkey, squirrel and even the raccoon were competitors for the Indian and so these were hunted to extremely low numbers. The millions of pigeons viewed by William Wood and billions later by xx in

western Massachusetts. Like the buffalo and other species these were artifacts, explosions of populations contained at low levels for centuries by Indians who kept an extremely sophisticated and complete control over the land.

Box Materials Not Used
Paleo-Archaic-Woodland Schema

In the 1960s archaeologists constructed a framework for the evolutionary developments in material and cultural practices that has been broadly applied to eastern people: *Paleo* (Explorers); *Archaic* (Settlers); *Woodland* (Farmers) and *Contact* (exchange between the native Americans and Europeans).

The *Paleo* group was the descendant wave of people who spread across North American from Asia. Envisioned as big game hunters, these people occupied a vast subarctic landscape of open tundra inter-fingered with forests of spruce, birch, aspen and larch along stream courses and valleys. These wandering newcomers persisted in small bands across New England until about 8,000 years ago when thick forested prevailed under a warmer climate. The term “Explorer” conveys a sense of expansion and discovery of people crossing an unoccupied continent hunting widely-roaming species while adjust to a rapidly cinghanging environment.

Archaic people were “Settlers,” a term that captures the sense of increasing stability in lifestyle and landscape that prevailed from 8,000 to 3,000 years ago when temperatures peaked, temperate woodlands flourished, and Indian populations adjusted to their homelands. Along the coast, much of the Continental Shelf was submerged, the broad outline of the Cape and islands was emerging, and the rate of sea level rise was declining. Archaeologists infer that under these more stable conditions that familiar productive coastal habitats began contributing essential resources this classic hunter-gatherer society. With a moderate environment and lengthy experience in the land people tapped wide resources, enhanced their technology, and developed larger and more complex societies.

Woodland Farmers began to augment nature’s abundance with human production. This period represents the last step before *Contact* in the lengthy progression to agriculture in an environment broadly familiar today. Through exchange with other groups, tropical cultigens became firmly established as the centerpiece of a lifestyle accompanied by larger fixed settlements, greater cultural complexity, and increasing friction among adjoining groups for resources, territory and power.

This progressive framework provided the means of dating archaeological finds and standard against which New England came to be understood. The progression from capable hunter and gatherer to rudimentary horticulturalist and full-blown agriculturalist came to be viewed as normal and rather inevitable. Using this schema New England groups could be compared to the Iroquois and other groups with agriculture as well as more rudimentary people of the boreal world that lived beyond the reach of corn.

Indian Excerpt from Paleo

People were on the land, travelling it extensively and shaping it. Through countless activities they altered it maintaining encampments, collecting firewood, hunting, collecting nuts, fruits and plants and most likely even spreading fire. Through the use and reuse of sites over generations and even thousands of years these people certainly exerted an impact. At a site level there is ample evidence for this retained in the soils, middens and shell mounds that they left. They would have cleared sites for encampments; they would have scrounged the available dead wood across a large forest area. And, with wood providing heat as well as cooking their food, they turned to saplings and larger trees for energy and other needs. And, by the 12th c. or so they began to plant maize on a local scale. Their efforts were focused, deliberate, spatially organized across the landscape varying seasonally and concentrated on specific species while flexible to opportunity. They hunted deer heavily and would have certainly played a role in determining its abundance and that of other mammals, fish and shellfish that was utilized extensively.

But these were a people that were integrated into the land and living with and from the abundance and capacity of the landscape rather than controlling it and shaping it in specific directions to produce a greater abundance or large surpluses of specific resources for itself. Consequently direct impacts of people were light, their influence was subtle and the nudges that they gave to the natural ecosystems were modest. Dispersed in small groups the footprint of their most intense activity, settlement and daily life, was small and confined, distributed and shifting. The distribution of these many sites within the landscape was not random. Indeed, in each region—river valley, coast, and upland for example the location of intensively used areas followed predictable patterns with regards to proximity to wetlands and particular water bodies and preference for specific types of terrain and exposure. But to the extent that these people exerted impacts and their activities formed gradients of impact, they paralleled natural gradients in the environment of e.g., soil moisture, vegetation composition or geomorphology reinforcing these and would be invisible if kept light. In space, across the landscape, and through time, as the environment and vegetation changed there would have been corresponding changes in the type and intensity of human activities and use. As long as the landscape remained broadly forested and these human activities didn't generate abrupt shifts and discontinuities in time or space they will be invisible.

There are other considerations. As witnessed by the remarkable natural reforestation of the Vineyard and all of New England following farm abandonment there is an incredible natural propensity for trees to establish on open sites and forest to dominate the landscapes. In pre-European times, with tree-less patches small and the cover of forest great, it would have been challenging to keep areas open. In the absence of active effort throughout the year all but extremely wet sites or those lacking soil would fill with shrubs, trees and other woody growth rapidly. In this regard Indians in New England and across most of the Americas lacked the tool that enabled Europeans from the Iron Age to the colonists arriving here to open and transform a heavily forested land to one of

savanna, fields and grasslands. That tool was domestic grazing animals—cows, pigs, goats, horses and sheep. Through their incessant and highly selective feeding these animals can prevent forest regeneration and rapidly favor the establishment and spread of grasses, sedges and other plants that can resist repeated grazing. In New England, where every effort at clearing forests needed to be followed by endless maintenance the chronic action of domestic animals was an essential capacity needed to transform the land that the Indians lacked.

The issue of fire is complex and the inability of any technique historical, paleocological or archaeological to determine the exact frequency, intensity or geography of past fires in New England opens the door widely for speculation. We do know that aboriginal people used fire and that New England Indians were described at an earlier date as using fire. We also know that every Indian had the tools to generate fires as desired.

"They strike fire in this maner; every one carrieth about him in a purse of sewed leather, a Minerall stone (which I take to be their Copper) and with a flat Emerie stone (wherewith Glasiers cut glasse, and Cutlers glase blades) tied fast to the end of a little sticke, gently he stricketh upon the Minerall stone, and within a stroke or two, a sparke falleth upon a piece of Touchwood (much like our Spunge in England) and with the least sparke he maketh a fire presently" Brereton ⁱ

However, we also know that the descriptions emerging from ethnohistories are incorrect at best. For example, it is simply impossible to burn the coastal forests annually. An experiment set up to evaluate the consequences of such a fire frequency was modified as it ran out of fuel. With bare sand resulting and an inadequate cover of shrubs and leaf litter to sustain a fire the study concluded with rejecting William Wood's description and also debunking the notion that fires generate a nice open understory or grassland. If grassy stretches are desired sheep or mowers are needed not fire.

Indeed, even Day and Cronon concede on this point. For Cronon this perspective on fire lies within a footnote. Though easily overlooked it drastically reduces the estimated scale of human impact on the landscape presented elsewhere in the book. And, when it is recognized that villages did not actually exist at all, it leaves one wondering whether there was any such impact at all.

"It seems that there is no evidence in the early authorities for the wholesale annual conflagration of southern New England which Raup found unacceptable but only burning 'in those places where the *Indians* inhabit' (Wood 1865)". Day 1998 ⁱⁱ

"But Raup was no doubt right that the entirety of southern New England was never regularly burned; I have limited the claims of my argument to the local vicinity of village sites". Cronon 198x ⁱⁱⁱ

Moreover the evidence shows that across New England that fires increased following European settlement. If European times provide the basis for understanding we can certainly conclude that fires in Indian times were infrequent. Similarly, although fire is cited as encouraging oak and pitch pine and decreasing the abundance of mesic and less fire tolerant species—beech, maple, gum, hickory and white pine—the studies show that this latter group of species were more abundant during Indian times than in the years

following. European activity drove these species into the nooks and crannies of the landscape and exerted a pronounced impact beyond any effect by Indians.

This is not to say that Indians did not help to shape the landscape or that fire did not play a role in directing the pattern and composition of the vegetation over thousands of years. But this activity and influence was subtle and therefore indistinguishable from the dynamics and landscape variation that are attributable to independently assessed changes in climate and the known patterns of variation in soils and geomorphology. Given the inherent inertia of vegetation dynamics and the lengthy legacies that are generated by disturbance processes even infrequent application of fire to the landscape could have long lasting consequences for vegetation patterns. For example, for more fire sensitive species burning at intervals of 50 to 100 years or more could serve to greatly restrict its presence from an area and maintain the abundance of more fire tolerant species. Across readily flammable landscapes like the Great Plain, which is flat, underlain by sand and prone to drought, infrequent fire may have maintained the dominance of oak species and pitch pine. While it is clear from successful plantings and the spread of species like white pine, red maple and exotic spruces that more mesic species can prosper on this landscape it would require extremely lengthy fire free periods for these to prosper.

This stands in striking contrast to regions where archaeology confirms the widespread presence of agriculture. In the Huron region of Ontario and Iroquois region of New York, maize pollen occurs persistently, fields and large villages may be recognized in sharp increases in grasses and weeds, and abrupt changes in charcoal and forest composition major shifts in land use including forest clearance.

Summary of New England Lifestyle in Contrast to their Iroquoian Neighbors

- *A low density of people in dispersed and mobile encampments of temporary structures on sites used seasonally but repeatedly over thousands of years.* Versus large villages, fortifications, and permanent structures.
- *Small groups of hunter-gather-collectors subsisted on diverse wild foods: deer, fish, many other vertebrates, shellfish, nuts, and diverse plant materials.* Versus intensive farming, large corn fields, and food storage for large populations.
- *Corn and beans arrived just hundreds of years before Europeans and comprised a minor supplement to a diet of wild food.* Versus crops as a major staple.
- *Great consistency in the hunting and gathering lifestyle over thousands of years.* Major changes in lifestyle over time or across New England.
- *Healthy lifestyle with little malnutrition or injuries from fighting and warfare.* Versus dental caries and nutrient deficiencies from maize diet, evidence of substantial rivalries and fighting.

- *A wholesale transformation in Indian populations and the landscape with European colonization with a growing use of agriculture among the remaining native people.*

ⁱ Brereton, 1903, p. 10). Ritchie, W. A. 1969. *The archaeology of Martha's Vineyard*. The Natural History Press. New York. Introduction, 5-7. Cheever, G. B. 1848. *The Journal of the Pilgrims at Plymouth, in New England, in 1620*. John Wiley, New York.

ⁱⁱ Pg 40. Day (1998) *In Search of New England's Native Past: Selected Essays by Gordon M. Day*. Foster, M. K. and Cowan W. (Eds). University of Massachusetts Press, Amherst, MA.

ⁱⁱⁱ Cronon 198x p. 181 Footnote