A Changing World: 8,000 Years of Native American Settlement Along the Missisquoi River in Highgate, Vermont

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Introduction

In 1980, the Village of Swanton proposed to expand its hydroelectric facility located in Highgate Falls, Franklin County, in northwestern Vermont (Figure 1). From that year until 1996, the Consulting Archaeology Program, University of Vermont, conducted extensive archaeological studies as part of the environmental review which the Village of Swanton completed to obtain an operating license from the Federal Energy Regulatory Commission. (Complete project documentation can be found in Thomas, Carder and Florentin 1997.) Eighteen prehistoric sites were identified within the Highgate Falls Hydroelectric Project. Sites were present on all of the large floodplains and alluvial terraces tested. The number and complexity of the prehistoric sites prompted designation of the entire project area as the Highgate Falls Prehistoric Archaeological District, which is eligible for listing on the National Register of Historic Places. Archaeological studies related to the Highgate Falls Hydroelectric Project have made an unprecedented contribution to our understanding of Vermont’s past, particularly in terms of changing environments and how Native American communities used this stretch of one of Vermont’s major river valleys during the Early Archaic (about 8,000 years ago), Late Archaic (about 3,750 years ago) and Middle to Late Woodland periods (about 2,000 to 350 years ago).

Environmental Setting

The Highgate Falls Prehistoric Archaeological District encompasses approximately 73 hectares (180 acres) of land. The west end of the district begins at the Village of Swanton’s hydroelectric dam at Highgate Falls and extends east along a 5.6 km (3.5 mi) stretch of the Missisquoi River to East Highgate. It includes all land between the 220 ft contour line and the river.

In wider geographical context, the district is located in the large physiographic region known as the Champlain Lowland and, more specifically, within the Missisquoi River watershed of northwestern Vermont. The Champlain Lowland is a region of rolling country, with hills, low mountains, north-south trending ridges separated by less rugged areas, flat lake-shore terraces, and river floodplains. The Missisquoi watershed is part of the larger St. Lawrence River Basin. The Missisquoi reaches the St. Lawrence by way of Lake Champlain and the Richelieu River. Its total length is about 142 km (88 mi). Of the 2,214 km² (865 mi²) drainage area, 1,602 km² (626 mi²) are in Vermont, draining about 6.5% of the state (Pierce 1917:186; Vermont Department of Water Resources 1974:2). The first major fall line occurs at Highgate Falls approximately 23 km (14.4 mi) upstream from the river’s mouth.

The total lake and pond area in the drainage basin equals only 3.6 km² (1.4 mi²; Vermont Department of Water Resources 1974:2). Swamps and marshes occur mostly near the confluence of the Missisquoi River and Lake Champlain and probably served as major resource attractions for prehistoric populations. Within the archaeological district, however, wetlands are rare, and all streams are small, have fairly steep gradients, and drain the valley edges, suggesting that neither wetlands nor small streams were contributing factors in how people used this section of the river.

Most of the Champlain Lowland, including the project area, lies within a major vegetation zone referred to as the Transition Hardwoods-White Pine-Hemlock zone (Westveld et al. 1956). This zone contains a variety of hardwood species characteristic of zones to the north (beech, birch and maples) and south (oaks and hickories). These may occur in the same forest, or northern and southern types may alternate in a mosaic, along with white pine, hemlock, and less common species. Although exact forest composition and species distributions in the prehistoric period cannot be precisely determined, a potential diversi-
Figure 1. Project Location.
ty of woodland habitats existed in fairly close proximity to the project area. They supported large game animals such as white-tail deer, moose and bear, a variety of small mammals, birds and turtles. They also provided plant resources, including bark, roots, medicinal herbs, berries, seeds and nuts. As a result, a variety of hunting and gathering opportunities existed within the district. Major fisheries and plants and animals which favor wetland habitats were limited.

**Changing Landscapes and Climatic Variability**

One of the most significant environmental changes within the general project area was the radical transformation of the landscape. Some 12,600 years ago, the land was covered by an inland extension of the Atlantic Ocean known as the Champlain Sea. Numerous Champlain Sea features have been mapped in the general area of Highgate, including a large, sandy delta complex located at elevations between 300 and 320 ft asl (above sea level) above the valley bottom (Wagner 1972). This delta formed in the Champlain Sea roughly 11,500 years ago (Fillion 1970). Between then and about 10,200 years ago, the level of the Champlain Sea dropped dramatically, and deltas at lower elevations formed to the west of Highgate. By 8,000-9,000 years ago, Lake Champlain had formed at an even lower elevation to the west. In the project area, the Missisquoi River cut a 1,220-m (4,000-ft) wide and 30-m (100-ft) deep trench through the former delta. Today, large exposures of both marine and earlier sediments are visible on both the north and south banks of the river, between elevations of 300-320 ft asl (the delta top) and 180-200 ft asl where broad floodplains and narrower terraces have formed next to the channel of the river. Much of our early study during this project focused on reaching a better understanding of how the floodplains and terraces along the river changed, at what rate, and how such changes might have affected our ability to find archaeological sites of different ages.

In 1982, deep backhoe testing was designed to provide information on the structure and age of different alluvial terraces in the lower (VT-FR-103), middle (VT-FR-140) and upper (VT-FR-134) sections of the archaeological district (Figure 2). Contour maps were prepared to record the topographic relief and establish the boundaries of alluvial features. Radiocarbon dates derived from logs recovered from the base of two alluvial terraces at VT-FR-140, radiocarbon dates from archaeological sites located near the terrace surfaces, and aerial photographs provided important supplemental information. The radiocarbon chronology made it possible to approximate when different areas became available for prehistoric occupation. In 1983, more detailed studies were conducted at VT-FR-140 to record the stratigraphic sequences in greater detail. An expanded sample of logs was recovered from the base of the terraces and used to refine the chronology of floodplain development (Brakenridge et al. 1988; Thomas and Dillon 1983).

The most complete record of floodplain development is derived from the work at VT-FR-140. Three alluvial terraces are present. These are referred to as the T0, T1, and T2 terraces, in order from youngest to oldest. The lowest terrace (T0) is the modern floodplain. During much of the year it lies only 1-1.5 m (3-5 ft) above the river surface at an elevation of about 190 ft asl. Elsewhere along the river, low alluvial T0 terraces are not continuous, but are well developed and reach widths of 9 m (30 ft). At VT-FR-140, the surface of the next higher terrace (T1) lies at an elevation of approximately 194-196 ft asl. The terrace has a maximum width of 91 m (300 ft). Elsewhere, T1 terraces along the river range from 15 to over 300 m (50 to over 1,000 ft) in width. The highest (T2) terrace surface is positioned at an elevation of roughly 196-200 ft asl and is approximately 91 m (300 ft) wide.

Each terrace sequence consists of three basic units. At the base of the sequence, deposits of sand, gravel and cobbles mark the location of former river channels. The middle unit consists of thin beds of silt and sand which were deposited in shallow and fairly slow moving waters on the lee edge of the channel. During periods of flooding, trunks and branches of trees were deposited along the river bank. Over time, as the river channel shifted to the south, younger and younger trees were buried in these fine sediments beneath the terraces. The upper unit consists of layers of silts and sands which were deposited on the terrace surface during periods of high water. All archaeological deposits were encountered within the upper unit.

Cultural artifacts, radiocarbon dates from logs recovered near the base of the T1 and T2 terraces, and several buried soils facilitate the reconstruction of local floodplain history. The highest terrace probably began to develop along the north bank of the Missisquoi River some 9,000-9,500 years ago, although no firm date for its inception has been established. People first occupied the terrace some 8,300 years ago. By roughly 7,500 years ago, the highest (T2) terrace had reached its maximum extent.

At approximately 7500 B.P. (years before present), a lower (T1) terrace began to form along the edge of the river channel. By roughly 1375 B.P., a wide terrace was established to the south of the T2 terrace. Two buried soils near the
Figure 2. Stratigraphic trenches used for geomorphological studies.
front of the terrace are associated with numerous episodes of prehistoric occupation dating between roughly 500 and 2,000 years ago. While the TI terrace expanded some 87 m (285 ft) south of the T2 terrace between approximately 7500 and 1375 B.P., it did so at irregular intervals. Based on a sequence of eight dated logs and estimates of former river bank locations, the rates at which the channel shifted varied from 0 to 4 m (0 to 13 ft) per 100 years. The changing rates may well reflect long-term climatic variability.

Various sources suggest that the period from 7500 to roughly 5200 B.P. in the upper Midwest and into the Northeast was one of fairly warm and moist conditions. In some regions, precipitation may have been as much as 25-30% higher than at present. Major flooding was common along a number of river systems (Thompson and Bettis 1982). At VT-FR-140, during roughly the same period (ca. 7500-5370 B. P.), the river channel and edge of the TI terrace shifted rapidly to the south at an average rate of 3 m (10 ft) per 100 years. Based on close similarities in the stratigraphic sequences at all three sites, large portions of the alluvial terraces which underlie VT-FR-103 and VT-FR-134, located both downstream and upstream from VT-FR-140, formed at the same time. Thus, regional climatic factors are likely to have been at play.

The subsequent period, dating from approximately 5200 to 2800 B.P., was characterized by a climatic shift to drier conditions. In the upper Midwest, Thompson and Bettis (1982) found this to be generally a period when major rivers entrenched and flooding was infrequent. The fact that the average rate of lateral channel movement exhibited in the TI terrace sequence at VT-FR-140 between 5370 and 2100 B.P. was about .3 m (1 ft) per 100 years, or about one-tenth that of the previous period, suggests a substantial decrease in precipitation in Vermont as well.

Cyclical fluctuations in temperature and precipitation after 2800 B.P. are noted in the pollen records of the upper Midwest (Voight and O'Brien 1982), and parallel trends may have been characteristic of Vermont. Within the TI terrace sequence at VT-FR-140, an expansion of the TI terrace at a rate of about 1.5 m (5 ft) per 100 years between roughly 2100 and 1895 B. P. correlates with a period of increased regional precipitation. Beyond this, however, the chronological control is insufficient to identify subtle variations in the depositional record. Radiocarbon dates from cultural features associated with a distinct occupation horizon and buried soil near the surface along the TI terrace front do indicate, however, that little significant flooding occurred here between roughly 1200 and 510 B.P., a time when regional pollen data indicate low rates of precipitation. Future research in other alluvial settings will be required to determine whether or not this apparent terrace stability at VT-FR-140 reflects wider climatic patterns.

Changing channel configurations through time can be extrapolated using the strong similarities among the stratigraphic exposures on the TI terrace at VT-FR-140 and those encountered on the low terraces upstream at VT-FR-134 and downstream at VT-FR-103, as well as radiocarbon dates from the log samples at VT-FR-140 and from archaeological features encountered near the surface of the various terraces. Approximate channel locations were projected for different periods: ca. 8000 B.P., 6300 B.P., 5000 B.P. and post-4000 to pre-1200 B.P. (Figure 3).

Stratigraphic studies of the TI terrace at VT-FR-140 and at comparable terraces at VT-FR-103 and VT-FR-134 have important archaeological implications. Only one confirmed small camp site dating between roughly 8000 and 2000 B.P. was encountered within the Highgate Falls Prehistoric Archaeological District. In contrast to the numerous occupations which occurred after 2000 B.P. along this stretch of the Missisquoi, the paucity of earlier sites remains a mystery. Certainly, some of the earlier sites may have been destroyed as the river channel shifted over time and T2 terraces eroded. However, substantial portions of all of the TI floodplains had formed by roughly 5000 B.P. Major portions of these terrace surfaces were available for human occupation and any archaeological deposits should be identifiable at fairly shallow depths. The facts that sampling was undertaken to depths of a meter or more and that all archaeological deposits encountered on the TI terraces were less than 2,000 years old suggest that testing methods did not bias site recognition. The scarcity of sites dating between 8,000 and 2,000 years ago is likely due to other factors, perhaps to substantial differences in how Native American communities used this stretch of the river over some 8,000 years of recorded occupation.

The Archaeological Studies

Initial studies within the Highgate Falls Prehistoric Archaeological District confirmed that many sites contained a broad range of environmental and archaeological information. However, the research potential of individual sites differed. At some sites, modern plowing, stream bank erosion or very low artifact densities suggested that it would be difficult to interpret the cultural activities carried out. At other sites, limited plowing or the burial of deposits under flood sediments meant that additional cultural and environmental information could be readily gained. When integrity, clarity, artifact and feature content, and the age of
Figure 3. Changing river channel locations, 8,000 to pre-1200 B.P.
the archaeological deposits were considered together, it was concluded that the greatest amount of information could be obtained from a select sample of sites. A mitigation plan for the Highgate Falls Hydroelectric Project was developed by the Consulting Archaeology Program and the Vermont Division for Historic Preservation and subsequently approved by the federal Advisory Council on Historic Preservation.

Three sites were selected for extended data recovery (Figure 4). These sites included VT-FR-134, which contained evidence of multiple episodes of occupation during the Middle-Late Woodland periods, VT-FR-104, which was believed to contain evidence of Middle-Late Woodland period occupations, and VT-FR-140. Within VT-FR-140, which covered an extensive area, data recovery focused on four major sub-areas (Table 1). Bessette 1 and Bessette 4 were located on a low (T1) terrace along the modern channel of the river. Two distinct occupation levels were represented at Bessette 1. These areas contained extensive evidence of Middle-Late Woodland period occupations. Bessette 2 and Bessette 3 were located on a higher (T2) terrace where evidence of two Early Archaic and one Late Archaic period occupations was identified. Large block excavations, totaling 602.5 m² (6,482 ft²), were completed in ten sample areas within the district.

The primary goal of the archaeological project was to obtain baseline data from a sample of Archaic period sites, which were virtually undocumented in western Vermont, and from an extended sample of sites occupied during the Middle and Late Woodland periods. Thorough descriptions of the artifact assemblages and activity areas from all sites provide a solid foundation for future comparative studies.

Table 1. Occupation Periods Represented at Data Recovery Study Areas.

<table>
<thead>
<tr>
<th>Occupation Period</th>
<th>Site and sub-area</th>
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<tbody>
<tr>
<td>Early Archaic</td>
<td>VT-FR-140, Bessette 2</td>
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<tr>
<td></td>
<td>VT-FR-140, Bessette 3, Locus 1</td>
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<tr>
<td>Late Archaic</td>
<td>VT-FR-140, Bessette 3, Locus 2</td>
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<td></td>
<td>VT-FR-140, Bessette 3, Locus 4</td>
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<tr>
<td>Middle and Late Woodland</td>
<td>VT-FR-104</td>
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<td>VT-FR-134</td>
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<td>VT-FR-140, Bessette 1, Locus 3</td>
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<td></td>
<td>VT-FR-140, Bessette 4</td>
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Thirty-four radiocarbon dates anchor these sites and provide the temporal control which is currently unavailable in other parts of Vermont. This study led to the identification of a new style of Early Archaic period projectile point and provides the only radiocarbon date for the use of Early Archaic bifurcate base projectile points in Vermont. The two Early Archaic period sites point up the variability in site types of this era. One is a residential base occupied for an extended period; the other is a much smaller camp which was only briefly occupied. One small camp dating to about 3750 B.P. represents the ephemeral use of this stretch of the Missisquoi River during the Late Archaic period. Studies at Middle to Late Woodland period sites identified an atypical style of notched triangular projectile point and recovered a rare clay pipe, grinding stone and stone gorget. Although there are similarities between the Middle and Late Woodland period sites along this 3.5-mile stretch of the Missisquoi River and contemporaneous sites in the Champlain Lowland, the repetitive use of small extractive camps and small residential bases between summer and late fall, beginning about 2000 B.P. and increasing through time, documents a significant component of the Middle and Late Woodland period subsistence and settlement systems. Comparable data exist nowhere else in the state.

**Early Archaic Period**

In 1983, when intensive excavations were initiated in the district, only one Early Archaic period site had been excavated in Vermont (Thomas and Robinson 1983). Even today, fewer than 40 sites of this period have been identified throughout the state, and of these, only six have been intensively sampled. Excavations at VT-FR-140, Bessette 2 and Bessette 3, Locus 1 provide essential information about Early Archaic period artifact assemblages, the types of activities residents undertook, and variation in site function during this very poorly known period of Vermont's history. A marked contrast in site function between Bessette 2 and Bessette 3, Locus 1 is particularly evident.

The two Early Archaic sites are situated on different portions of the same alluvial terrace, but their structure and date of occupation differ. Bessette 2 is located at the eastern end of the high (T2) terrace at VT-FR-140 and is estimated to encompass an area of approximately 10 x 44 m (30 x 144 ft). Site structure was complex. On higher portions of the terrace, the surface at the time of occupation was probably close to the modern surface. Prehistoric artifacts were recovered from the plow zone, as well as from the upper 20-30 cm (8-12 in) of an underlying B horizon. In the southern portion of the excavations where a former river bank exists, virtually all artifacts were recovered from
Figure 4. Location of sites selected for extended data recovery.
Native American Settlement Along the Missisquoi River

depths of 50-100 cm (20-39 in) below the modern surface. A radiocarbon date of 7730 ± 180 B.P. was obtained from a burned tree root which intruded through a distinct layer of artifacts on the terrace front. Since the root, and hence the radiocarbon date, must be younger than the date of occupation, a date of roughly 7700-8100 B.P. is the best estimate of the age of the occupations) represented at Bessette 2.

Bessette 3, Locus 1 is located about 135 m (440 ft) west of Bessette 2 and near the front of the same (M) terrace. At the time of occupation, the river channel was probably located only 5-10 m (16-32 ft) away. Bessette 3, Locus 1 was identified when the remains of a hearth were found in the side wall of a long backhoe trench used to record the alluvial stratigraphy beneath the T1 and T2 terraces. A 14.75 m² (159 ft²) block was excavated on the west side of the trench to more fully expose the hearth and associated artifacts. A 1 x 1.5 m unit excavated on the east side of the backhoe trench showed that deposits did not extend in this direction. Based on the distribution of artifacts, the occupation area may be as small as 6 x 8 m (20 x 26 ft), about one-tenth the area of Bessette 2.

The occupation of Bessette 3, Locus 1 was roughly contemporaneous with that at Bessette 2, but probably occurred several hundred years earlier. Two charcoal samples derived from a single hearth identified at Bessette 3, Locus 1 were submitted for radiocarbon dating. Dates of 7970 ± 270 B.P. and 8500 ± 130 B.P. were obtained. The dates overlap between 8240 and 8515 B.P., indicating the approximate age of this brief occupation.

The artifact assemblages from Bessette 2 and Bessette 3, Locus 1 reflect the different activities people undertook using stone tools in one site occupied for an extended period and one occupied only briefly. People residing at Bessette 2, a fairly large residential base, used a variety of stone artifacts to prepare and maintain their hunting equipment, to process items made from hide, wood, bone or antler, and to fell trees. Related artifacts include 4 projectile points, 5 scrapers, 3 large tabular blades, 38 modified and utilized flake tools used for cutting and scraping, 1 cell and 2 choppers. Substantial efforts also went into making projectile points. Associated artifacts include 2 cores, 13 bifaces, 4 hammerstones, and 23,403 flakes. In contrast, the occupants of Bessette 3, Locus 1 left few artifacts behind, and all are related to replacing or preparing projectile points for hunting. They include the bases of 2 bifurcate base projectile points, 1 quartz core, 1 hammerstone, 775 chert flakes, 2 quartzite flakes, and 40 quartz flakes.

In 1980, excavations at the John’s Bridge site, located just 5.6 km (3.5 mi) downstream from VT-FR-140, exposed a single component Early Archaic period site on a high terrace above the Missisquoi River. Three radiocarbon dates from the same feature overlap between 7850 and 8230 B.P. Rather than bifurcate base points, this site contained points which are generally corner-notched. They are designated Swanton corner-notched points (Thomas and Robinson 1983). Given the geographical distribution of sites containing Swanton corner-notched and bifurcate base points, the Champlain Basin appears to have been a frontier zone between contemporaneous and overlapping projectile point styles. The bifurcate base forms clearly indicate cultural contacts to the south; Swanton corner-notched points most likely reflect community contacts to the north and west (Thomas 1992).

The four projectile points and point fragments recovered from Bessette 2 suggest that even greater variability in projectile point styles may be characteristic of the period around 8000 B.P. Two points are too fragmented to assign them to a specific type. The two other points are thin, have parallel sides, small side notches and ground bases (Plate 1). These points do not fit comfortably into the general form of Swanton corner-notched points identified at the John’s Bridge site (Thomas and Robinson 1983:60), nor do they resemble Early Archaic bifurcate base points. However, the presence of large tabular blades which occur
Plate 1. Early Archaic period projectile points from Bessette 2. Top: newly identified side-notched points. Bottom: projectile point fragments which cannot be assigned to a specific type.

Plate 2. Early Archaic period tabular blades from Bessette 2.

exclusively on Early Archaic period sites, and a post-occupation radiocarbon date of 7730 ± 180 B.P. from Bessette 2 strongly suggests that occupations here are roughly contemporaneous with other Early Archaic period sites recognized at Bessette 3, Locus 1 and throughout the Champlain valley. This variation in projectile point style must be carefully considered in future research, since some early sites might otherwise go unrecognized.

The tool assemblages at Bessette 2 and Bessette 3, Locus 1 indicate that people made ready use of locally available raw materials. Most tasks were undertaken with a variety of quickly made tools, particularly flake knives and scrapers produced from cores or by fragmenting river cobbles. Other tools were made from large tabular pieces of shale, slate or other fairly soft rock whose edges could be roughly shaped (Plate 2). The specific function of these large tabular blades remains unresolved. Suggestions include cutting tools used to process wood, knives used for skinning or for separating hides from a carcass, or some type of chopper (Funk and Wellman 1984; Thomas and Robinson 1983). Similar blades have been recovered from other Early Archaic period sites, including the John's Bridge site and sites of similar age as far south as the Susquehanna River drainage in Pennsylvania.

In contrast to the expediency tools, projectile points required considerably more preparation and access to sources of quality material. The site’s occupants probably secured the necessary material from one or more chert quarries located at the head of St. Albans Bay, about 16 km (10 mi) southwest of Bessette 2. At the quarry, large blanks were roughed out for transport to the site. At Bessette 2, these blanks were further thinned and reduced in size. This activity is represented by the large workshop located on the terrace front. Some of the thinned blanks were shaped into finished points. Many blanks were probably taken from the site for later use. The intense use of flake tools and the storage of thinned blanks which could be transformed into finished projectile points at a later time suggests that the occupants of Bessette 2 were fairly mobile and, for the most part, carried only essential items as they traveled.

Bessette 2 and Bessette 3, Locus 1 point up the contrast in the types of Early Archaic period sites which probably exist throughout western Vermont. Bessette 2 represents one or more small residential bases occupied by families for an extended period of time. Bessette 3, Locus 1 is
At Bessette 2, people undertook a variety of activities in at least two nuclear areas, each roughly 25-40 m² (269-430 ft²) in size. Nuclear areas encompass portions of a site where most family activities took place, and where a shelter, hearth(s) and the associated debris from a variety of cooking, processing and manufacturing activities are likely to be found (Yellen 1977). One nuclear area focused around two hearths was located in the western portion of the excavation block. Stone tools recovered in this area consisted of a large tabular blade and four large flake knives, which may have been used to cut meat or process food resources. Another activity included completing the final stages of making a projectile point for a spear or dart. A second nuclear area was located in the eastern portion of the excavation block. Again, much activity involved food preparation and eating. Bones were either thrown into three hearths or discarded in the surrounding area. On several occasions, residents manufactured stone tools, resharpened tool edges and used the sharp edges of flakes to cut or scrape various raw materials. Shelters, although they were probably present at the time of occupation, were not identified.

Based on sampling undertaken beyond the excavation block, cultural deposits also extend approximately 30 m (100 ft) to the northeast along the terrace front. Additional nuclear areas are likely to be present within Bessette 2. Because the nuclear areas appear to be spread out along the terrace and do not seem to overlap, as one might expect if the same group returned to the site on a recurring basis, Bessette 2 is likely to be a residential base established by three or more families who set up their own shelters and maintained their own hearths.

Almost 9,000 pieces of bone were recovered from in and around the hearths at Bessette 2. Because the bone was highly fragmented, only 37 elements can be identified to species. They are all Odocoileus virginianus, white-tailed deer. Given the presence of deer bone in all five hearths, at least several deer are represented. An unidentifiable medium-sized mammal was also eaten. Analyses suggest that deer were killed, field dressed at a kill/processing site away from camp, and transported to the site for distribution and consumption. This activity indicates that Bessette 2 was likely a residential base occupied for several weeks or perhaps even several months. As we will see, this pattern is substantially different from that exhibited at later Middle-Late Woodland period sites where hunting parties were transporting much of the game to larger settlements located elsewhere.

In addition to the nuclear areas, a large stone tool manufacturing workshop was encountered in the southwest corner of the excavation block at Bessette 2. Within the workshop, which was used on a number of occasions, a dense concentration of over 20,700 chert flakes, five broken chert bifaces (partially completed blanks) and two hammerstones were recovered from a 13 m² (140 ft²) area. The mean density of 1,592 chert flakes per square meter is higher here than at any other site in the district, suggesting the intensity of tool preparation and the likelihood that these people were gearing up in a major way before they moved on.

From all indications, Bessette 3, Locus 1 represents the remains of a small camp established along the banks of the Missisquoi River over 8,000 years ago. Only a small assemblage of artifacts was left behind in an area of about 15-20 m² (161-215 ft²). Given the lack of distinct cutting and scraping tools and the presence of two broken projectile points, it seems likely that most activities undertaken during this episode of occupation were directed towards hunting. The bases of the two projectile points were discarded when hunters returned to camp and made other points to replace broken ones. Two distinct clusters of chert flakes were encountered, indicating that the site's occupants needed to replace their spear or dart tips on several occasions. The high incidence of chert and quartz would indicate that local sources of stone were used almost exclusively by this group and that the occupants had been downstream nearer the lake where chert was available prior to moving up river. The repair of hunting equipment was undertaken as the site's occupants sat close to a small hearth. No food remains were observed during excavation, and subsequent screening of large soil samples through 1-mm mesh screens failed to produce any bone. Although hunting was probably the focus of activity, the absence of bone in the hearth may indicate the lack of success and that the residents soon moved on.

Less than 20 years ago, some archaeologists were convinced that few if any Native Americans lived in Vermont during the Early Archaic period. We now know that not only did people live here, their cultural systems were far more complex than we might have once imagined. Substantial variability in subsistence and settlement patterns on a regional level may be characteristic of the Early Archaic period. Such variability is strongly suggested by the fact that sites containing either bifurcate base or Swanton corner-notched projectile points have been recorded in a number of environmental settings, including the shore of Lake Champlain, around lowland ponds, high alluvial terraces along the major rivers of western Vermont, interior streams, and sandy plains between major...
The Journal of Vermont Archaeology

watersheds (Thomas 1992). Even at the local level, variability is apparent. Although Bessette 2 and Bessette 3, Locus 1 are located on the same terrace and were occupied at roughly the same time, these sites were used in substantially different ways. These sites provide clear evidence that during the Early Archaic period people utilized both small camps and larger residential bases as they used the resources along one of Vermont’s major rivers.

**Late Archaic Period**

The Late Archaic period, dating to approximately 3,000 to 6,000 years ago, is barely represented at identified sites within the Highgate Falls Prehistoric Archaeological District. Two episodes of occupation dating to the Late Archaic period are likely to be represented by archaeological deposits encountered on the central portion of the highest (T2) terrace at VT-FR-140, which encompasses roughly 3.8 acres.

Initial sampling provided fairly broad coverage, but only limited archaeological deposits were encountered. Thirty-eight quartzite flakes recovered from a single test pit indicated the presence of a toolmaking area and possibly an associated living area. This test pit became the starting point for excavations within Bessette 3, Locus 4 (see below). Single quartzite flakes in three other widely separated test pits were far less suggestive of areas of focused activity. Additional testing produced limited results. Bessette 3, Locus 2, an area surrounding two positive test pits, was further sampled with larger excavation units. When only sparse evidence of activity was recovered, excavations within Bessette 3, Locus 2 ceased.

Bessette 3, Locus 4 encompassed an area of roughly 13 x 8 m (43 x 26 ft). Charcoal recovered from a single hearth was radiocarbon dated to 3750 ± 60 B.P., reflecting a Late Archaic period of occupation. From all indications, Bessette 3, Locus 4 represents the remains of a single small camp, probably occupied by a few individuals or perhaps a single family. Most of the archaeological remains encountered were focused in an 8-10 m² (86-108 ft²) area. A narrow range of artifacts was recovered, including 2 projectile point fragments, 892 quartzite flakes, 19 quartz flakes, 69 small pieces of burned bone and 1 small fragment of fire-cracked rock. The two projectile point fragments are made of Cheshire quartzite and appear to be portions of a stem, perhaps from the same point. Too little of this point(s) remains to assign it to a specific type. Based on the distribution of quartzite flakes and the broken projectile point(s), at least three episodes of tool production occurred in an area of roughly 6 m² (65 ft²) next to a hearth.

The hearth measured approximately 75 x 65 cm (30 x 26 in). It was probably built on the surface of the ground, since the staining was no more than 2.5 cm (1 in) thick. All but one piece of burned bone and the one fragment of fire-cracked rock were found immediately adjacent to the western edge of the hearth. The 69 highly fragmented pieces of bone were also very weathered. While it is clear that hunting was undertaken and that some of the meat was prepared and consumed on site, no specific animal species could be identified.

The fact that several episodes of projectile point manufacture occurred suggests that the site was occupied for at least several days. Hunting was probably a primary activity, but whether this site was established specifically to serve as a hunting camp to provision a larger settlement located elsewhere or whether the residents were fairly mobile and simply moved on once the game had been consumed cannot be determined from the available evidence. The absence of chert, which is easily available downstream to the west, and the prominence of quartzite, which outcrops over 80 km (50 mi) to the south, as a raw material for tool manufacture suggests that the occupants of Bessette 3, Locus 4 were moving in a fairly broad territory.

Bessette 3, Locus 4 represents the only episode of occupation within the Highgate Falls Prehistoric Archaeological District which can be confidently dated to the Late Archaic period, to roughly 3750 B.P. Based on the stratigraphic characteristics, archaeological deposits associated with Bessette 3, Locus 2 and with a few other areas of low artifact density found in widely scattered but very restricted portions of Bessette 3 may be roughly contemporaneous. The only other identified deposits within the entire district which may date to the Late Archaic period were found on a high terrace at VT-FR-104. Although sampling on higher and older terraces within the district was more limited than that undertaken on the lower and younger T1 terraces and floodplains along the river, the overall results indicate that between roughly 7500 and 2000 B.P., people made very little use of this section of the Missisquoi River during their seasonal rounds. This inference is strongly supported by the absence of Late Archaic and Early Woodland period occupations on large portions of the lower terraces along the river, which were intensively sampled. These terraces were well established by about 5000 B.P. and approached their modern configurations by about 2000 B. P. at VT-FR-140, VT-FR-134, VT-FR-103 and VT-FR-104. Since strong sampling biases are not evident, people appear to have made little use of this particular stretch of the river for a very long period of time.
Although some studies indicate that Late Archaic and subsequent Early Woodland period sites are located out of the river bottom near Highgate Falls (Bartone, Robinson and Petersen 1991; Hartgen Archaeological Associates 1995; Thomas and Dillon 1985), research is needed to determine if these patterns of site location are characteristic of wider portions of the Missisquoi watershed and how such patterns may reflect long-term cultural choices people made about where to position their sites in the Missisquoi Valley. Based on the data from Highgate, such choices appear to have been significantly different than those made by communities during the Middle and Late Woodland periods.

Middle-Late Woodland Period

Beginning about 2,000 years ago, Native American communities began to make increasingly active use of the Missisquoi River valley between the falls at Highgate Falls and East Highgate. Middle and Late Woodland period occupations dating to this time were intensively sampled at three sites within the Highgate Falls Prehistoric Archaeological District: VT-FR-104, VT-FR-134 and VT-FR-140. Some 49 episodes of occupation are represented within the areas sampled. For the first time anywhere in the state, these sites provide significant information about patterns of technology, subsistence and settlement which are characteristic of a single stretch of a major river valley. These data provide a critical base for comparative studies of Middle to Late Woodland period cultural systems within the Missisquoi and other major watersheds in western Vermont.

VT-FR-104 was located on the south bank of the river towards the downstream end of the district and about 1.1 km (0.7 mi) upstream from the first major falls on the river (Figure 4). The site was situated on a roughly 0.2-acre portion of a low alluvial terrace (equivalent to the T1 terrace at VT-FR-140) which is crossed by two intermittent streams. In the past, the terrace was probably much wider, but modern erosion has reduced its size. VT-FR-140 is located about 2.7 km (1.7 mi) above the falls. Because the T1 terrace at VT-FR-140 covered roughly 3.5 acres, this portion of the site was subdivided into four sample areas, referenced as Bessette 1, Loci 1-3 and Bessette 4. The three loci at Bessette 1 were located close to the modern channel near a major bend in the river. Two distinct occupation horizons, designated Level 4 and Level 6, were encountered at Bessette 1, Locus 1 and Locus 2. Bessette 4 was located on an extension of the same terrace, but about 150 m (500 ft) downstream. VT-FR-134 was located on a low ten-acre (equivalent to the T1 terrace at VT-FR-140) towards the upstream end of the district and about 5 km (3.1 mi) upstream from the falls. The site was also situated on a low terrace equivalent to the T1 terrace at VT-FR-140 which today is approximately 23 m (75 ft) wide. Some of VT-FR-134 has been lost to modern erosion along the stream bank. Based on the horizontal and vertical structure encountered at these various sites, eight sample areas containing archaeological deposits dating to the Middle and Late Woodland periods are represented in the analysis.

Although the periods of occupation represented within each of these eight areas vary (Table 2), when taken together, the radiocarbon dates derived from 34 features indicated that occupations along this stretch of the Missisquoi span the time interval from 2100 ± 20 B.P. to 250 ± 50 B.P., during which archaeologists refer to as the Winooski phase (2050-1650 B.P.), Intervale phase (1450-1150 B.P.) and Colchester phase (1150-900 B.P.) of the Middle Woodland period and throughout the Late Woodland period (900-300 B.P.). Approximately 49 episodes of occupation are represented in the sample areas, as reflected by the presence of hearths dating to different periods. Nuclear living areas which were focused around small hearths can be identified within these sample areas, but in most cases, it is impossible to define the boundaries of associated artifact scatters related to single nuclear areas or to assign discrete artifact assemblages to individual episodes of occupation, due to the overlapping nature of the deposits. For this reason, data from the sites and sample areas may be best considered as reflecting various aspects of the technological, subsistence and settlement patterns of the Middle and Late Woodland periods in general, although some technological variations are apparent over time.

<table>
<thead>
<tr>
<th>Sample Area</th>
<th>Estimated Period of Occupation Based on Range of Radiocarbon Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bessette 1, Locus 1, Level 6</td>
<td>2010 ± 120 to 1210 ± 120 B.P.</td>
</tr>
<tr>
<td>Bessette 1, Locus 2, Level 6</td>
<td>1800 ± 70 B.P.</td>
</tr>
<tr>
<td>Bessette 1, Locus 1, Level 4</td>
<td>1180 ± 50 to 570 ± 70 B.P.</td>
</tr>
<tr>
<td>Bessette 1, Locus 2, Level 4</td>
<td>1230 ± 70 to 550 ± 60 B.P.</td>
</tr>
<tr>
<td>Bessette 1, Locus 3</td>
<td>610 ± 60 to 610 ± 80 B.P.</td>
</tr>
<tr>
<td>Bessette 4</td>
<td>1670 ± 190 to 1010 ± 60 B.P.</td>
</tr>
<tr>
<td>VT-FR-1345</td>
<td>1130 ± 110 to 510 ± 80 B.P.</td>
</tr>
<tr>
<td>VT-FR-104</td>
<td>ca. 250 ± 50 B.P.</td>
</tr>
</tbody>
</table>
Middle to Late Woodland Period Technology

The stone and ceramic artifacts recovered from Middle and Late Woodland period sites provide considerable information about the tools people used to undertake a variety of hunting, processing and food preparation activities. Stone tools reflect an intensive focus on hunting. A total of 121 projectile points or projectile point fragments were present in seven of the eight sample areas (Table 3). The exception was Bessette 1, Locus 2, Level 6, where only a small nut processing area was identified in a 5 m² (54 ft²) portion of the larger excavation block. The projectile point types reflect the point styles commonly encountered at sites of this time throughout western Vermont. These include triangular Levanna and Madison points, one Jack’s Reef pentagonal point, and four Jack’s Reef corner-notched points. Four atypical notched triangular points were recovered at VT-FR-134.

Triangular Levanna points were present in all sample areas where at least one of the episodes of occupation can be dated to either the Intervale or Colchester phases of the Middle Woodland period or to the Late Woodland period, or between 1080 ± 90 and 250 ± 50 B.P. (Plates 3, 4). Most points were made from either chert or quartzite derived from the Champlain Valley. One point is made of local quartz.

One Jack’s Reef pentagonal and four Jack’s Reef corner-notched projectile points were recovered from three, and possibly four, sample areas within the district (Plate 3). The points are probably associated with one or more Intervale phase (ca. 1150-1450 B.P.) episodes of occupation, indicated by the direct association of the Jack’s Reef pentagonal point with a hearth dated to 1180 ± 90 B.P. and the base from a Jack’s Reef corner-notched point recovered from a hearth dated to 1430 ± 60 B.P.

Four projectile points recovered at VT-FR-134 cannot be placed into any known typology for Vermont (Plate 4). All are made from Champlain Valley chert. In general outline, they are similar to triangular Levanna points, but each point has weak notches along its sides. Given the fact that they were all recovered within 6 m (20 ft) of one another, they may represent an idiosyncratic variation of the Levanna form made by a single hunter or small group of people. On the other hand, notched triangular projectile points occur as minority types on St. Lawrence Iroquoian sites to the north (Tuck 1978:330). Their recovery at the Roebuck site in Ontario which dates to roughly 450-550 B.P. and at the Mandeville site in southern Quebec along the Richelieu River suggests a Late Woodland period date for their occurrence (Wintenberg 1972:23, 132; Chapdelaine 1989:246). Closer to Vermont, three notched triangular points were recovered in southern Quebec from a site located on an alluvial terrace adjacent to the Pike River about 5 km (3 mi) upstream from its confluence with Lake Champlain on Missisquoi Bay. The site is attributed to an occupation by St. Lawrence Iroquoian people at about 650 ± 110 B.P. (Blais, Chapdelaine and St-Amaud 1996). Data from VT-FR-134 seem to support a roughly contemporaneous date of occurrence. At VT-FR-134, one of the notched triangular points and portions of two very Late Woodland period ceramic vessels with incised castellated rims were recovered in association with a charcoal enriched soil that was radiocarbon dated to 510 ± 90 B.P. However, the close proximity of features dating to an earlier period of occupation makes this inference tentative. Given the fact that such notched triangular points were not encountered at other sites within the district, it is not possible to clearly demonstrate any long-distance interaction with the St. Lawrence Iroquois to the north, but the possibility should not be overlooked in future research.

Plate 3. Typical Middle and Late Woodland period projectile points from Bessette 1. Top and middle rows: Levanna points. Bottom row, left: Jack’s reef pentagonal. Bottom row, center and right: bases of Jack’s Reef corner-notched points.
Native American Settlement Along the Missisquoi River

Plate 4. Middle and Late Woodland period projectile points from VT-FR-134. Top and middle rows: Levanna points. Bottom row, left: Madison point. Bottom row, center and right: unusual notched triangular points.

Other formal flaked tool categories recovered from one or more Middle to Late Woodland period sites include scrapers, drills or perforators, a knife, and wedges (Table 3). Most scrapers were used to process hard substances such as wood, bone and/or antler in order to create or repair parts of a hunter's tool kit, such as bows, arrow, tool handles, traps or other types of equipment. The edge polish and rounding on a few scrapers suggests that they may have been used to process animal hides. Drills, perforators and wedges were recovered within three of the large sample areas. Most drill bits are broken, suggesting that they were used to prepare fairly hard materials such as wood (Plate 5). Small chert or quartzite wedges were probably used to split wood or possibly bone. Much of the processing at all Middle to Late Woodland period sites involved the use of expediency tools made from small to medium-sized flakes whose sharp edges were used for both cutting and scraping. Most of these flakes were probably selected from the chert and quartzite debitage which resulted from projectile point manufacture, but some may have been intentionally struck from cores which were brought to a site as a source of raw material.

Plate 5. Typical Middle and Late Woodland period scrapers and drills.

Although they were not often found, celts, pitted nutting stones, large grinding stones, small tabular stones and choppers are related to both woodworking and nut or plant processing activities (Plate 6). Fragments from a two-holed gorget were recovered from an early Middle Woodland occupation horizon and represent the only stone artifact recovered which was probably worn by an individual (Plate 7).

Artifacts related to flaked stone tool manufacture, particularly projectile points, are common to all sample areas, reflecting a consistent need to replace expended tools. Related artifacts from these Middle to Late Woodland period sites include cores, bifaces and preforms (nearly completed arrow points), and over 32,500 pieces of debitage. Chert and quartzite cores appear to be derived from bedrock sources. They are typically small and exhibit flake scars on all surfaces, suggesting that they were partially worked at the source and then brought to the site. Here,
Table 3. Artifacts recovered at Woodland period sites.

<table>
<thead>
<tr>
<th>Artifact Type</th>
<th>Site Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BI-1/6</td>
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<tr>
<td>Projectile points</td>
<td></td>
</tr>
<tr>
<td>Levanna</td>
<td>16</td>
</tr>
<tr>
<td>Madison</td>
<td>1</td>
</tr>
<tr>
<td>Notched triangle</td>
<td>1</td>
</tr>
<tr>
<td>Jack's Reef</td>
<td>1</td>
</tr>
<tr>
<td>Stemmed</td>
<td>1</td>
</tr>
<tr>
<td>Fragments</td>
<td>12</td>
</tr>
<tr>
<td>Scrapers</td>
<td>9</td>
</tr>
<tr>
<td>Drills</td>
<td>4</td>
</tr>
<tr>
<td>Perforators</td>
<td>1</td>
</tr>
<tr>
<td>Knives</td>
<td>1</td>
</tr>
<tr>
<td>Wedges</td>
<td>1</td>
</tr>
<tr>
<td>Modified flakes</td>
<td>3</td>
</tr>
<tr>
<td>Utilized flakes</td>
<td>27</td>
</tr>
<tr>
<td>Cores</td>
<td>2</td>
</tr>
<tr>
<td>Bifaces</td>
<td>16</td>
</tr>
<tr>
<td>Preforms</td>
<td></td>
</tr>
<tr>
<td>Debitage</td>
<td></td>
</tr>
<tr>
<td>Chert</td>
<td>138</td>
</tr>
<tr>
<td>Quartzite</td>
<td>42</td>
</tr>
<tr>
<td>Quartz</td>
<td>107</td>
</tr>
<tr>
<td>Jasper</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
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<tr>
<td>Celts</td>
<td>1</td>
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<tr>
<td>Pitted nutting stones</td>
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<td>Grinding stone</td>
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<td>Tabular stones</td>
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<td>Choppers</td>
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<tr>
<td>Gorget</td>
<td>1</td>
</tr>
<tr>
<td>Hammerstones</td>
<td>1</td>
</tr>
<tr>
<td>Ceramic vessels</td>
<td>2</td>
</tr>
<tr>
<td>Ceramic pipe</td>
<td>1</td>
</tr>
</tbody>
</table>
Plate 6. Middle and Late Woodland period artifacts related to projectile point manufacturing and processing. Top row: bifaces. Middle row: bifaces and two cores. Bottom row: tabular stone, celt reused as a nutting stone, and a hammerstone.

they were discarded when they either broke or could not be adequately thinned. Chert derived from the Hathaway formation, which outcrops approximately 16 km (10 mi) to the west at the head of St. Albans Bay on Lake Champlain, and quartzite, which likely derives from exposures of Cheshire quartzite common to the Monkton-Bristol area some 80 km (50 mi) to the south, are by far the dominant types of raw material represented at all sites. In a few instances, quartz cobbles derived from the nearby river bed were utilized as a source of raw material.

Such a pattern of raw material selection is typical at Middle to Late Woodland period sites along the lower Missisquoi River and throughout the Champlain Valley (Petersen and Power 1983; Thomas and Dillon 1985; Vermont Division for Historic Preservation 1991). This fact, at least if the probable source locations are correct, suggests that people during the Middle and Late Woodland periods followed several strategies for acquiring raw material. They may have moved within a fairly broad territory and acquired supplies of chert and quartzite when they encountered workable outcrops. Specialists may have visited various quarries to extract the raw material and subsequently reduced the material to large blanks or cores. Once transported back to the home bases, finished tools could be made when needed. Alternatively, local exchange networks could have provided adequate sources of stone.

The dominant use of Champlain Valley materials during all episodes of occupation is, however, somewhat surprising. At the Winooski and McNeil sites, located on the lower Winooski River near Lake Champlain, a high frequency of non-local chert and jasper tools and debitage from tool manufacture were recovered from Intervale phase occupations (ca. 1150-1450 B.P.). This led to the inference that raw materials were being exchanged among peoples living throughout a wide geographical area (Petersen and Power 1983; Thomas 1980). Much of this “exotic” material was apparently imported in the form of finished tools or small, prepared blanks for the manufacture of stone tools. With both the McNeil and Winooski sites exhibiting large quantities of “exotic” materials, it was hypothesized that non-local stone, especially lustrous, fine grained New York cherts and Pennsylvania jasper, would typically be found at

Plate 7. Portions of a Middle Woodland period two-holed gorget.
This was only partially the case. Within the district, three of the five Intervale phase Jack's Reef projectile points are made from local Champlain Valley chert. The exceptions include the base from a Jack's Reef corner-notched point made of rhyolite and a tang from a similar point made from jasper. The debitage, left as a result of stone tool manufacture, reflects the near exclusive use of local materials. Exceptions include nine tiny jasper flakes from VT-FR-134; one jasper, one Onondaga chert and two possible Mistassini quartzite flakes from Bessette 4; and one flake of Mistassini quartzite from Bessette 1, Locus 1, Level 6. With the exception of two of the 48 scrapers and a single drill, all other tools were made from either chert or quartzite derived from the Champlain Valley. The presence of non-local materials suggests limited exchange linkages with southern Pennsylvania, central New York and north-central Quebec. Based on the very small quantities of exotic materials which are represented, however, the involvement of local populations in regional exchange networks seems to have been limited.

Overall, participation in such networks during the Intervale phase of the Middle Woodland period may have been quite variable and conditioned by seasonality and/or accessibility to traders. Warm season residential sites located on the lower Missisquoi near Lake Champlain, one of New England's primary transportation corridors, may contain far higher percentages of exotic material than sites located in upstream portions of the river systems, such as those in the Highgate district, where direct long-distance social contacts are less likely to have taken place. Given the pattern of short-term occupations within the district at this time, the scarcity of non-local materials is also likely to mean that quantities were insufficient to supply resident populations during most of the year. Clearly, the Highgate data point up the fact that substantially more research will be required before we can determine how, when and to what extent regional exchange systems operated.

The assemblages of ceramic vessels from all Middle to Late Woodland period sites within the district are limited, due to poor preservation and the highly fragmented nature of the vessels themselves. Nonetheless, 25 vessels were identified within seven of the eight sample areas. Since pottery is poorly preserved at most sites in western Vermont, these vessels are an important addition to the sample of known vessels from this period (Plates 8, 9). Portions of a unique ceramic pipe were also recovered at Bessette 1, Locus 3.

Within the Highgate sample, ceramic vessels from all time periods exhibit several common characteristics. Clay was mixed with fine to medium temper of feldspar and quartz, and sometimes including tourmaline and mica. Feldspar is the dominant material in all but a few of the vessels. All vessels were made using a coiling technique and typically fired in an oxidized environment, probably a small pit. Clay pots were generally small, suggesting that the vessels would hold from one to two quarts of liquid. Considerable variability does exist in the styles and techniques people...
used to decorate their clay vessels. For vessels dating to the Middle Woodland period, or before roughly 900 B.P., the forms of decoration include fabric impressions, cord-wrapped stick impressions, linear stamping, and some form of dentate stamping. By the later part of the Late Woodland period, or by about 600 B.P., decorative elements include horizontal and diagonal lines which were incised into the clay, cord fabric impressions on the body, and sometimes small punctations and cord-wrapped stick impressions.

A ceramic pipe from Bessette 1, Locus 3 is the only artifact of its kind recovered during the extensive excavations undertaken within the Highgate Falls Prehistoric Archaeological District. The pipe is tubular and expands slightly towards the mouth. A small hole connects the smoker’s end of the pipe to a recessed bowl in the tube. The exterior is decorated with numerous rows of circular punctations.

The pipe’s slightly expanding tubular form is uncommon for ceramic pipes of this period, which generally have a narrow stem, a bowl offset at a 70-90° angle and a flared lip around the bowl opening. At St. Lawrence Iroquoian sites to the north, where ceramic pipes are fairly common, bowls were frequently plain, had incised designs in various patterns, or were decorated with effigies. In several instances, rows of small, circular punctations, which are similar to the pattern exhibited on the pipe from Highgate, were utilized to create decorative elements (Clermont, Chapdelaine and Barre 1983:118, 163). Although fragments of ceramic pipes were apparently recovered at Vermont sites in the early part of this century (Huden 1971:54, 75), no detailed information is available for comparative purposes. One portion of a ceramic pipe bowl has been recovered from VT-FR-237, a Late Woodland period site dated to 480 ±80 B.P. and located about 3 km (1.9 mi) downstream from Highgate Falls. However, the form of the pipe is totally different from the one found at Bessette 1, Locus 3. The pipe has a stem, and the bowl was positioned at about a 90° angle, commonly referred to as an elbow pipe (Robinson, Dorshow and Corey 1993). The Highgate pipe may reflect cultural influences from St. Lawrence Iroquois communities to the north, as suggested by the similarities of decoration, or it may represent a distinct form characteristic of the Champlain Valley.

The stone tools and ceramic vessels recovered from Middle and Late Woodland period sites within the district provide considerable information about the types of artifacts people used to hunt, to make other pieces of equipment and to prepare captured game and plant foods during individual site visits. The ceramic pipe, a large prepared grinding stone, and notched triangular projectile points are unique to the Highgate assemblage and to assemblages from sites of this time period in other parts of Vermont.

Subsistence and Settlement Patterns

Analysis of the animal and plant remains from Middle and Late Woodland period sites provides considerable information about food procurement strategies, season of occupation and the types of Middle and Late Woodland period sites which are represented along this 5.6 km (3 mi) stretch of the Missisquoi River. All bone was highly fragmented, burned and weathered, and after detailed study of the 85,740 bone fragments, only 589 (0.7%) were identified as to specific species.
Analyses of the animal bone indicate that in terms of presence or absence of mammals, birds, fish and reptiles, estimated minimum numbers of individuals, and biomass (quantity of meat) for the species identified within seven sample areas, the Middle to Late Woodland period sites are very similar. A careful review of the food remains recovered from 31 hearths for which dates are available indicates that there are no apparent differences in the general makeup of the bone assemblages dating to the Middle and Late Woodland periods, or between roughly 1230 ±60 and 550 ±60 B.P. For a period of at least 680 years, there was apparently little change in the subsistence strategies people used to exploit this general environment. Subsistence strategies may have been similar over a long span of time, but assemblages from the earlier Middle Woodland period recovered from dated hearths at Bessette 1, Locus 1, Level 6 and Bessette 4, which range from 2010 ±120 to 1210 ±120 B.P., are too small to make meaningful comparisons. However, bone from deer, medium to large mammal, wood turtle and diving duck and a few beaver teeth are represented. Limited excavations at VT-FR-104 (ca. 250 ±50 B.P.) yielded deer and small mammal, which is consistent with the basic pattern noted above. Nuts recovered from hearths dating to both the Middle and Late Woodland periods provided an additional source of food for people during a number of occupations. Other types of plants which may have been collected as food, sources of fiber or for medicinal purposes have not survived in the archaeological record.

In terms of both estimated number of individuals and meat yield, deer are the primary game animals represented at Middle to Late Woodland period sites. Other mammals, birds, turtles, and fish made a negligible contribution to the diet. Bear and beaver were identified at only two or three of the sites. While we know that bear and beaver were hunted or trapped during the Middle and Late Woodland periods and were the dominant species recovered in at least one Late Woodland period site (Thomas, Carder and Florentin 1997), these animals were not commonly captured by people utilizing this stretch of the Missisquoi River. Habitat requirements may have been a contributing factor. Since the home range of an adult female black bear varies from 15-50 km² (5.8-19 mi²) and an adult male’s range is several times larger, bears may have been taken when encountered, but they are not likely to have provided a predictable source of food in this general area. The lack of sustainable wetlands and small, low-gradient streams undoubtedly kept local beaver populations to a minimum. In contrast, both the bottomlands and adjacent uplands probably supported a moderate population of deer which provided a reliable source of food and hides.

Several general patterns at all sites suggest a common approach to butchering and consumption of deer. Primary butchering occurred on site. The extremities, including lower legs and skulls, were utilized and then discarded. Some portions of deer, particularly the forequarters, were commonly consumed during site occupation. Most hindquarters, which provide the greatest proportion of usable meat, bone marrow and grease, were typically transported elsewhere. At Bessette 1, Locus 1, Level 4, several entire deer were consumed on site during one or two periods of extended occupation, providing an exception to the general pattern.

Although deer could have been hunted during all season of the year, bird, fish, reptile, bear and nut remains at one or more sites strongly suggest that warm season occupations were common. Diving duck, red-tailed hawk, gar and wood turtle in three sample areas at VT-FR-140 suggest a possible late spring to fall range of capture. A young deer and a fragment of deer antler at VT-FR-104, a young snapping turtle at VT-FR-134, and the occurrence of burned nut shells in five of the sample areas indicate that a number of occupation episodes also occurred at these sites during the period from late September to December. It may not be coincidental that this is also an excellent period for deer hunting, when animals are fat and hides are in prime condition.

Nearly all of the Middle and Late Woodland period occupations represented at VT-FR-104, 134 and 140 are directly related to the use of small extractive camps by parties intent on obtaining a sufficient quantity of game, particularly deer, to provision larger settlements. These settlements were probably located downstream near the lake where extensive evidence of contemporaneous sites has been encountered (Thomas and Robinson 1979). The two episodes of extended occupation represented at Bessette 1, Locus 1, Level 4 indicate that small residential camps where one or perhaps several families lived for a month or more were also incorporated into the Middle and Late Woodland period settlement systems.

Along this segment of the Missisquoi River, nuclear areas associated with small extractive camps were typically represented by single small hearths surrounded by limited scatters of burned bone. One or more small clusters of chert and quartzite debitage, representing the manufacture of one or several tools (most likely projectile points), were usually located nearby, so close that some of the debitage was often recovered from the hearth fill. Broken bifaces, projectile points, and expended cores were found in direct association with these small tool making areas, which
Native American Settlement Along the Missisquoi River

Some of the sample areas, suggesting that they were quickly built, with no intent of permanency. Although it is impossible to identify the maximum extent of artifact scatters related to any individual episode of occupation, nuclear areas appear to be roughly 6 m (20 ft) or less in diameter. Even in the case of two extended occupations represented at Bessette 1, Locus 1, Level 4, hearths, bone scatters and most artifacts were clustered within an area of 15 m² (161 ft²) or less.

Although it is not possible to arrive at a statistically based estimate of the total number of Middle to Late Woodland period occupations within the district, it is possible to make a general approximation. Within a total excavated area of 453.25 m² (4,876 ft²), 49 nuclear areas dating to the Middle and Late Woodland period were identified, or approximately one nuclear area for each 9.25 m² (100 ft²) excavated. Eighteen Middle and Late Woodland period sites, including the sites which were intensively studied, were identified on the low floodplains and terraces adjacent to the river. These sites encompassed a minimum of 22,500 m² (241,875 ft²). If the number of nuclear areas within the sample areas is typical of other sites along the river, then some 2,432 episodes of occupation are represented within these sites. In addition, the 18 sites were identified on the basis of only a 5-10% sample of the district as a whole, so the number of occupations may actually be substantially greater.

Such sites do, however, represent only part of a larger picture. Shortly after 1000 B.P., maize-bean-squash agriculture was introduced into New England. By 750-850 B.P., corn and beans had become an important part of the diet for communities in the Connecticut River valley in Vermont (Heekenberger, Petersen and Sidell 1992), suggesting that these domestic plant foods had also become an important part of the food economy for people living elsewhere in Vermont.

Considering the intensive labor involved in clearing land, planting, tending, harvesting and storing agricultural crops, it was hypothesized that such population pressure would be reflected in the Highgate Falls project area by an increasing frequency of at least food collecting sites, and perhaps small, multi-seasonal residential sites after 900 B.P. as communities intensified their use of upstream areas.

The Highgate data provided only limited support for this hypothesis. Small extractive camps which post-date 900 B.P. are certainly common within the district, but larger, multi-seasonal residential sites are not. The apparent continuity in the types of late Middle Woodland and Late Woodland period sites located along the river which pre-date and post-date 900 B.P., as well as their relative frequency, suggest that a radical change in how people used the Missisquoi valley did not occur at this time.

If a somewhat longer time perspective is considered, however, an important shift in settlement and subsistence patterns may be reflected in the Highgate data. Assuming that the relative number of hearths and associated radiocarbon dates in the sample areas reflect the general patterns of occupation over time, people appear to have made only limited use of the floodplains and terraces above Highgate Falls during the first half of the Middle Woodland period, between roughly 2050 and 1250 B.P. The small assemblages of artifacts left behind during occupations which can be dated to this time indicate that people were there for very brief periods. The relative frequency of sites dating to this 800-year period is also four times lower than that of sites dating to the subsequent 750 years (Thomas, Carder and Florentin 1997). Twenty-six episodes of occupation post-dating 1250 B.P. are represented in the record from Highgate. This trend suggests that, beginning about 1250 B.P., forays into upstream areas, particularly to hunt deer, became increasingly common. Within the next two centuries, this pattern was well established. Small fall residential camps were also incorporated into Middle and Late Woodland period settlement systems. Although the Highgate data do not directly resolve the issue of whether increasing population pressure on local food resources contributed in a major way to the adoption of agriculture about 900 B.P., they do indicate that several hundred years earlier, shifts did occur in the intensity with which communities used this portion of Missisquoi Valley. Population growth may well have been a contributing factor. Future research in other parts of the Missisquoi watershed and in other drainages throughout western Vermont may lend further support to this hypothesis and provide a clearer picture of what factors contributed to the Abenaki’s adoption of agriculture and what economic, social and political changes in their culture resulted.
Conclusions

Archaeological studies related to the Highgate Falls Hydroelectric Project have made substantial contributions to our understanding of Vermont's early history and have important implications for future research. From the studies of the floodplains and terraces along this segment of the Missisquoi, it is clear that major changes in the landscape have occurred during the past 10,000 to 12,000 years. In the major river valleys of Vermont in particular, all future archaeological studies must consider how such environmental changes may have affected the types, depths, contents and ages of archaeological sites which might be encountered in any specific area. The relationships between long-term climatic variability and cultural adaptation may be fruitfully pursued at a general level, but data from Highgate suggest that both climatic variability and broader cultural patterns influenced how people used a specific locale over long periods of time.

The stone and ceramic artifact assemblages recovered from the Early Archaic and Middle to Late Woodland period sites in Highgate, as well as the food remains and the types of activity areas identified within these sites, yield considerable information about what people were doing along this stretch of the Missisquoi River and also provide a solid baseline for future comparative studies of past Native American cultures. Thirty-four radiocarbon dates anchor these sites and provide the temporal control which is currently unavailable in other parts of Vermont.

As two of only six Early Archaic period sites excavated in Vermont, the Highgate sites provide a rare look at life during this period, and also suggest that the archaeological record may be more complex than we have imagined. The radiocarbon dates from Bessette 2 and Bessette 3, Locus 1 provide clear proof that people were living along the Missisquoi River more than 8,000 years ago. Based on the discovery of a new type of Early Archaic period projectile point at Bessette 2, additional Early Archaic sites may be identified throughout Vermont. Excavations at Bessette 2 and Bessette 3, Locus 1 illustrate that people at this time used at least several types of sites during their annual rounds. Small hunting camps were used for brief periods by a few individuals; larger residential bases were occupied by several families who hunted and collected resources in the area for weeks and perhaps for several months. Data from the Highgate sites and from the John’s Bridge site located downstream provide the starting point for future studies of the Early Archaic period in Vermont.

A fairly narrow range of stone and ceramic artifacts was found at Middle and Late Woodland period sites throughout the district, suggesting a heavy emphasis on hunting and the gathering of nuts in season. These sites also yielded unique or very unusual types of artifacts, including rarely seen styles of projectile points, a tubular pipe, a large grinding stone and stone gorget. While people made extensive use of local raw materials, long-distance exchanges of both technological ideas and raw materials are evident at times. For example, the presence of notched triangular points and the decorative elements on the pipe suggest that people living along the Missisquoi had contacts with the St. Lawrence Iroquois to the north.

It is estimated that over 2,400 episodes of occupation are represented within this 3.5-mile stretch of the Missisquoi River. Most represent small extractive camps where deer meat and other food resources were obtained for larger settlements downstream, predominantly during the warmer seasons of the year. These camps were first used about 2000 B.P., but after about 1200 B.P., the intensity of use increased. Small residential camps were also utilized on occasion by one or two families as they moved upstream during the fall. These sites clearly reflect major elements of the Middle and Late Woodland settlement and subsistence systems used by people living within the Missisquoi watershed. The intensity with which people continued to use this area after 1200 B.P. may indicate that the local population was expanding and that larger and larger portions of the watershed were increasingly utilized. Such growth may have provided the impetus for the adoption of corn-bean-squash agriculture by about 800 B.P. Similar patterns may have occurred in the Lamoille, Winoski and Otter Creek valleys to the south. How people in all watersheds integrated such extractive camps and small residential bases into even more complex annual settlement and subsistence systems is a question for future research, but the Highgate sites provide significant pieces of the larger puzzle.

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