

# The Cloverleaf Site: A Late Archaic Settlement on the Walloomsac River in Southwestern Vermont

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## Abstract

A Late Archaic period habitation site was identified in the fall of 1995 near the confluence of the Walloomsac River and Furnace Brook in southwestern Vermont. Situated on the floodplain of the Walloomsac River, it represents a rare example of a near single component site and it provides an unusually detailed glimpse into a relatively brief period of time during the Late Archaic period. It is specifically attributable to the River phase of the Late Archaic period, dated elsewhere to between 2000-1900 B.C. (or 4000-3900 B.P.) (Funk 1976; Ritchie 1965, 1969; Ritchie and Funk 1973). Ten of the radiocarbon dates obtained for this occupation thus far fall between 2070-1860 B.C. (or 4020-3810 B.P.), placing occupation of the Cloverleaf site within a short time span. After discussing the circumstances concerning discovery and subsequent investigation of the site, preliminary details about Cloverleaf are presented and its implications are explored in this article.

## Introduction

This is a preliminary report about the Late Archaic period Cloverleaf site located in the town of Bennington, Bennington County, southwestern Vermont. This archaeological study was conducted by the University of Maine at Farmington Archaeology Research Center (UMF ARC) for the Vermont Agency of Transportation (VAOT) and the Federal Highway Administration (FHWA). The Cloverleaf site is listed as Native American site VT-BE-233 in the Vermont Archaeological Site Inventory files maintained by the Vermont Division for Historic Preservation (VDHP).

The Cloverleaf site represents a relatively large and apparently short-term Late Archaic habitation site. In fact, the site is currently one of the best preserved and now thoroughly sampled Late Archaic habitation sites in Vermont and much of the larger Northeast. More specifically, the Cloverleaf site preserves a tremendous wealth of information concerning Native American technologies, subsistence and settlement patterns, as well as social interaction. It is largely unmatched in both local and regional contexts. This report provides preliminary information about the setting of the Cloverleaf site, a brief history of investigations, and salient observations about the site's archaeological contexts and artifact assemblage. In addition, its implications for local and regional Native American history are briefly explored.

## Cloverleaf Site Setting

The site is located on ancient alluvium and is owned by the State of Vermont. It lies adjacent to and southeast of a prominent meander in the Walloomsac River, in close proximity to its confluence with Furnace Brook. The site area is a likely location for habitation. It lies on a broad, fairly level alluvial floodplain adjacent to the eastern bank of the Walloomsac River. The site proper is bounded to the east and west by areas of relatively recent historic disturbance, including the construction and destruction/dismantling of a residential area once known as "Green Acres" and the site of a former junkyard, according to local informants (Cox et al. 1997a). To the north of the site lies the existing ramps connecting U.S. Route 7 and VT Route 67A, although these do not necessarily bound the site. In fact, it is likely that the Native American deposits extend or once extended to beneath the existing roadway. This setting is situated approximately 120 meters (394 ft) north of the confluence of the Walloomsac River and Furnace Brook. The Walloomsac drains into the Hoosic River an estimated 12 kilometers to the northwest of and downstream from the site area. The Hoosic River, in turn, is a major tributary of the Hudson River farther west in New York.

The Cloverleaf site lies within the middle portion of the broad Hudson River drainage in southwestern Vermont at an elevation of 175 m (580 ft) above mean sea level (Figures 1 and 2). The site surface is about 1.5-2.0 meters (5-6.5 ft) above the Walloomsac River, which currently lies approximately 80 meters (262 ft) to the northwest of the site proper. The location of the site on the floodplain of the Walloomsac River has buried Native American residential remains by mid-late Holocene alluvial deposition. Based on preliminary archaeological and geomorphologic interpretations, it appears that there are three separate terrace formations represented in the site area, designated terrace 1 (T1), terrace 2 (T2) and the most recent and currently building terrace, terrace 0 (T0). The Native American inhabitants of Cloverleaf lived on the floodplain surface associated with the T2 terrace. Due to a short-term stabilization of the floodplain, a soil, or weathered sediment, was able to form. The Late Archaic Native Americans lived and carried out various activities on this surface (referred to as a paleosol), which is now buried beneath 0.10-1.5 meters of more recent overbank alluvium (Cowie et al. 1998a).

Glacial till dominates the surrounding surficial geology

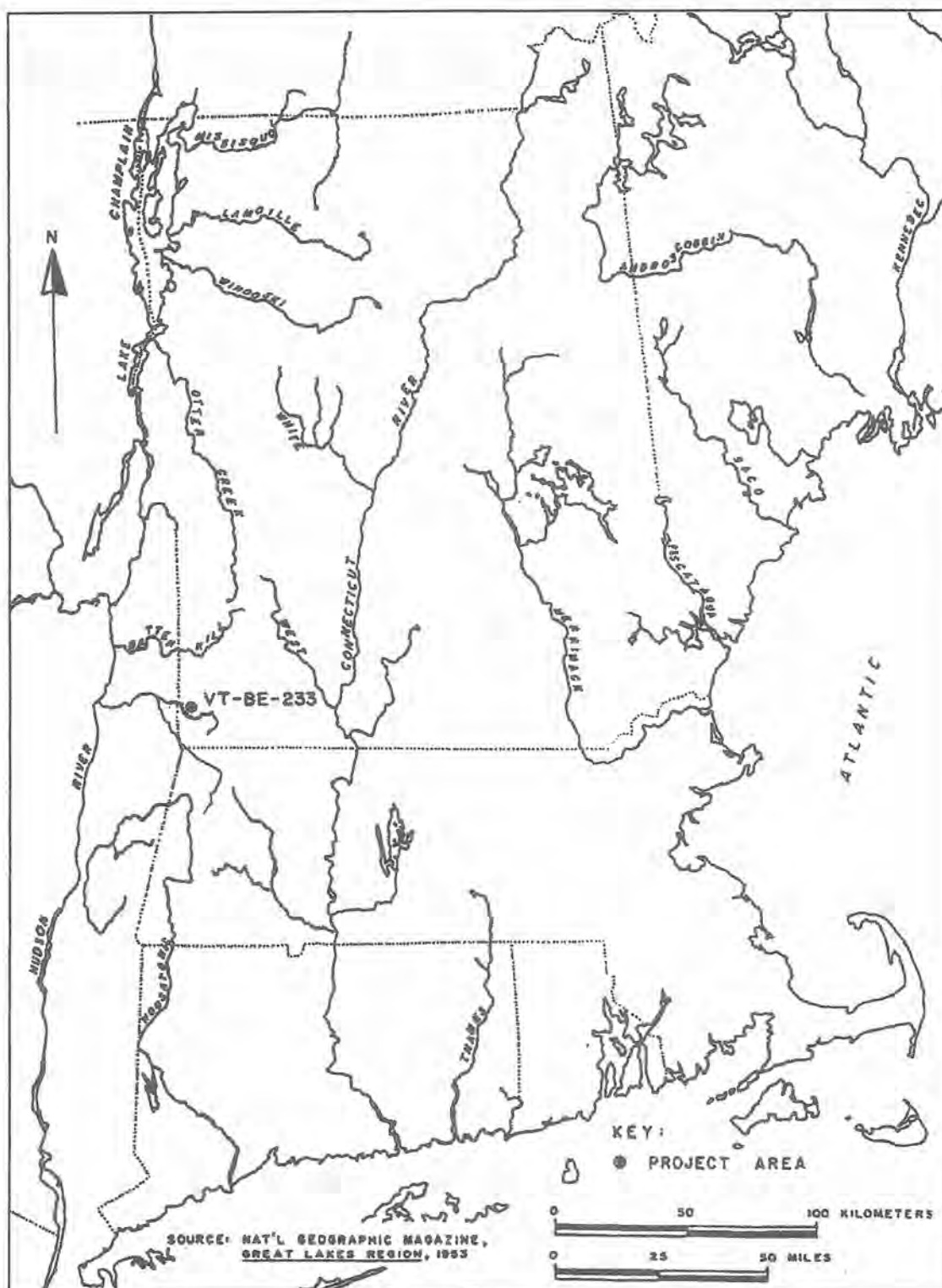


Figure 1. Location of the Cloverleaf site (VT-BE-233) within the Walloomsac-Hoosic River drainage of southwestern Vermont, northwestern Massachusetts, and easternmost New York State.

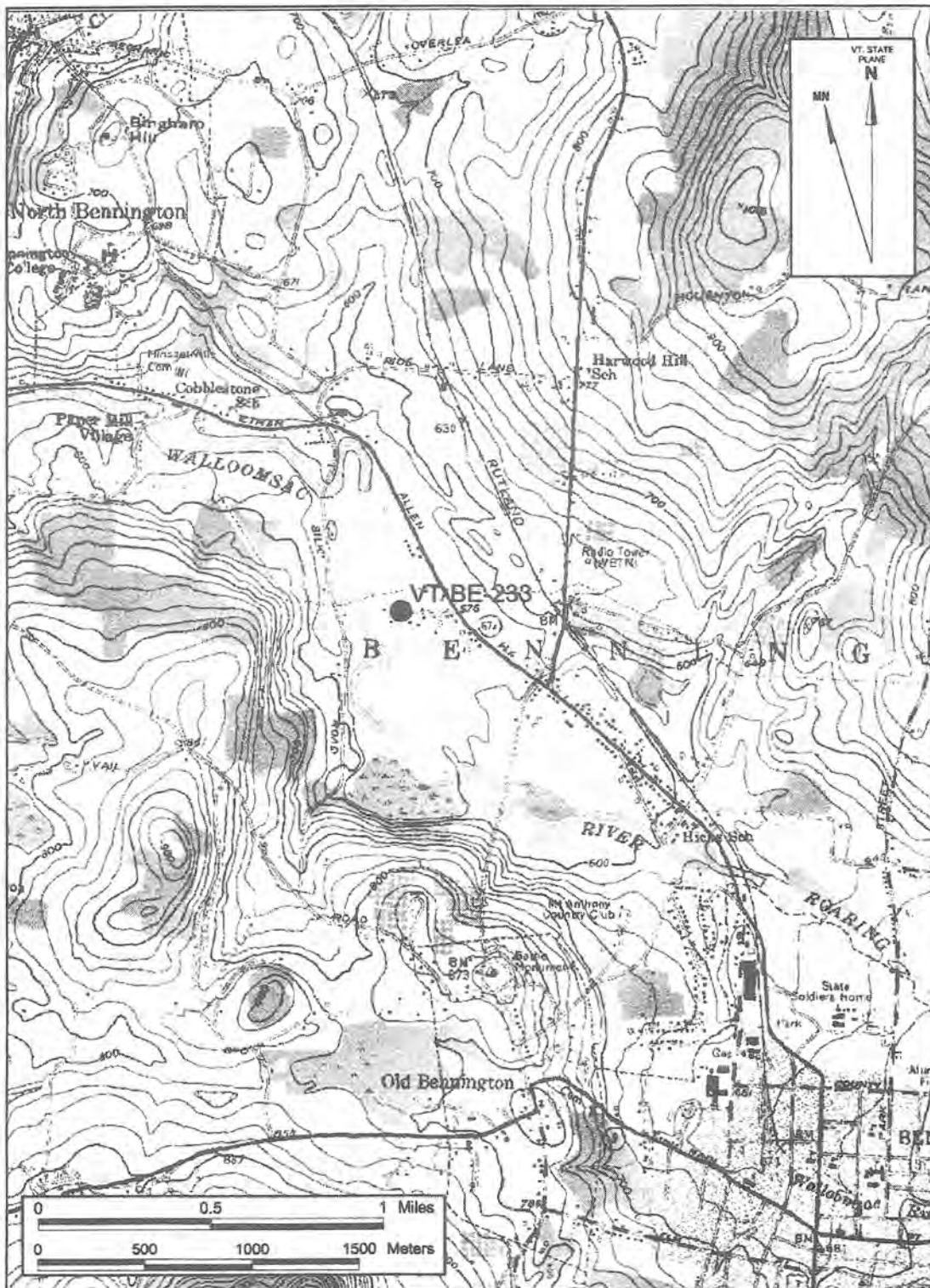


Figure 2. Location of the Cloverleaf site (VT-BE-233) on the Walloomsac River in the town of Bennington, Bennington County, Vermont (from the USGS Bennington quadrangle, Vermont-Bennington Co., 7.5' series).



with glaciofluvial outwash deposits and postglacial, fluvial alluvium present along limited stretches of the Walloomsac River and its tributary, Furnace Brook. Ancient Late Pleistocene littoral sediments, predominantly sand, lie along the interface of the Walloomsac alluvium and the glacial till (Doll 1970). Bedrock geology near the site is composed of black, carbonaceous and pyritic slate and phyllite of the Hortonville formation (Doll 1961).

### History of Investigations

The Cloverleaf site was first identified in the fall of 1995 as a result of a large-scale consulting study conducted by the UMF Archaeology Research Center for the VAOT and the FHWA. An extensive archaeological phase I survey was undertaken over the course of two field seasons in 1995 and 1996, in advance of construction of the proposed Bennington Bypass Project over a linear distance of 17.2 km overall. As a result of the phase I survey work, a total of 32 previously unknown archaeological sites were identified, including the Cloverleaf site.

Ultimately, a total of twenty-one 0.5 m by 0.5 m test pits spaced at 10 m intervals along four sampling transects, T21-T24, were used to sample the Cloverleaf site area (Figure 3). Two of these test pits were subsequently expanded into larger 1.5 m by 0.5 m test units, T22-2 and T23-9, to better sample the alluvial stratigraphy. The phase I test pits were excavated to an average of 91 cm below the ground surface, while the larger phase I test units reached maximum depths of 1.45 m and 1.20 m, respectively.

These phase I sampling transects were employed to test the western portion of a broad expanse of alluvial floodplain situated to south of the existing interchange between VT Route 67A and U.S. Route 7. The eastern portion of the landform had been previously subjected to phase I subsurface testing conducted by the University of Vermont Consulting Archaeology Program (UVM CAP) in 1979, quite near the site (Thomas et al. 1980:145). The 1979 field work was conducted as part of the preliminary archaeological studies related to an earlier configuration of the Bennington Bypass Project. The 1979 phase I work did not encounter the Native American deposits later identified by the UMF ARC, but this may have been due to the shallow depth of the test pits excavated in 1979. However it seems more likely that the site deposits do not extend easterly to the area of the previous subsurface testing based on more recent excavations, but this is uncertain.

In 1995, the phase I survey in this area initially included the excavation of a total of nineteen 0.5 m by 0.5 m standard test pits spaced at 10-meter intervals along three sampling transects, T21-T23. Of these 19 initial test pits, four, T22-2, T23-6, T23-10 and T23-12, were positive for unequivocal Native American artifacts. Further limited testing was subsequently conducted in 1995 in the area of these positive test pits.

Two of the phase I test pits, T22-2 and T23-9, were

subsequently expanded into larger 1.5 m by 0.5 m test units, as noted above, to facilitate penetration of the deep alluvial deposits. These larger test units were meant to examine buried cultural deposits encountered at the base of several test pits. Also, two additional 0.5 m by 0.5 m test pits were excavated at 5.0 m on either side (to the east and west) of test pit T23-8. Test unit T22-2 produced additional unequivocal Native American deposits, as did test pit T24-1, and test unit T23-9 produced additional fire-cracked rocks. The phase I artifact inventory included 12 lithic flakes (six quartzite and six chert), four possible lithic flakes (three quartzite and one of unknown material), one utilized chert flake, one possible hammerstone of unknown material, and 213 fire-cracked (or reddened) rocks.

Carbonized floral remains were collected in 1995 as well. Most were recovered from cultural features and possible features encountered during the phase I work. The majority of the Native American artifacts and ecofacts were recovered from seemingly intact, sub-plow zone sediments (to a maximum depth of 100 cm below the ground surface). The intact cultural deposits were concentrated in the southeastern portion of the site area.

Sediment profiles indicated that the northwestern portion of the site has been significantly disturbed historically. Notable historic disturbance reached as deep as 1.0 m below the ground surface there and various historic fill episodes were visible in the soil profiles as well, perhaps related to the historic junkyard and/or previous highway construction.

Stratigraphy in the southeastern portion of the site is much less disturbed. These profiles showed developed alluvial soils truncated by a plow zone approximately 30 cm thick. Of note, several test pit profiles showed lenses or patches of dark brown sediment within the sub-plow zone sediments. These dark lenses varied in thickness and occurred at varying depths across the site, ranging from 0.4-0.8 m below the ground surface. In some cases, feature designations were assigned to these lenses, as discussed below, although it was unclear whether they represented cultural features, or perhaps, portions of one or more buried surfaces, or paleosols.

A total of five cultural features were identified at the Cloverleaf site during the phase I testing. All five features were considered to be Native American in origin and all were identified in test pits/units situated in the southeastern portion of the site, below the plow zone disturbance. The function of each of these features remained unknown, however, given their limited exposure. Carbonized floral remains were recovered from all five features and four of these produced a total of 157 fire-altered rocks. In addition, five lithic flakes were recovered from three of the features.

A total of 449 historic Euro-American remains were also recovered from 20, or 95%, of the test pits/units. The majority of the historic remains ( $n=418$ , or 93%) encountered during the phase I field work were recovered throughout the disturbed soil profiles of the test pits in the northwestern portion of the

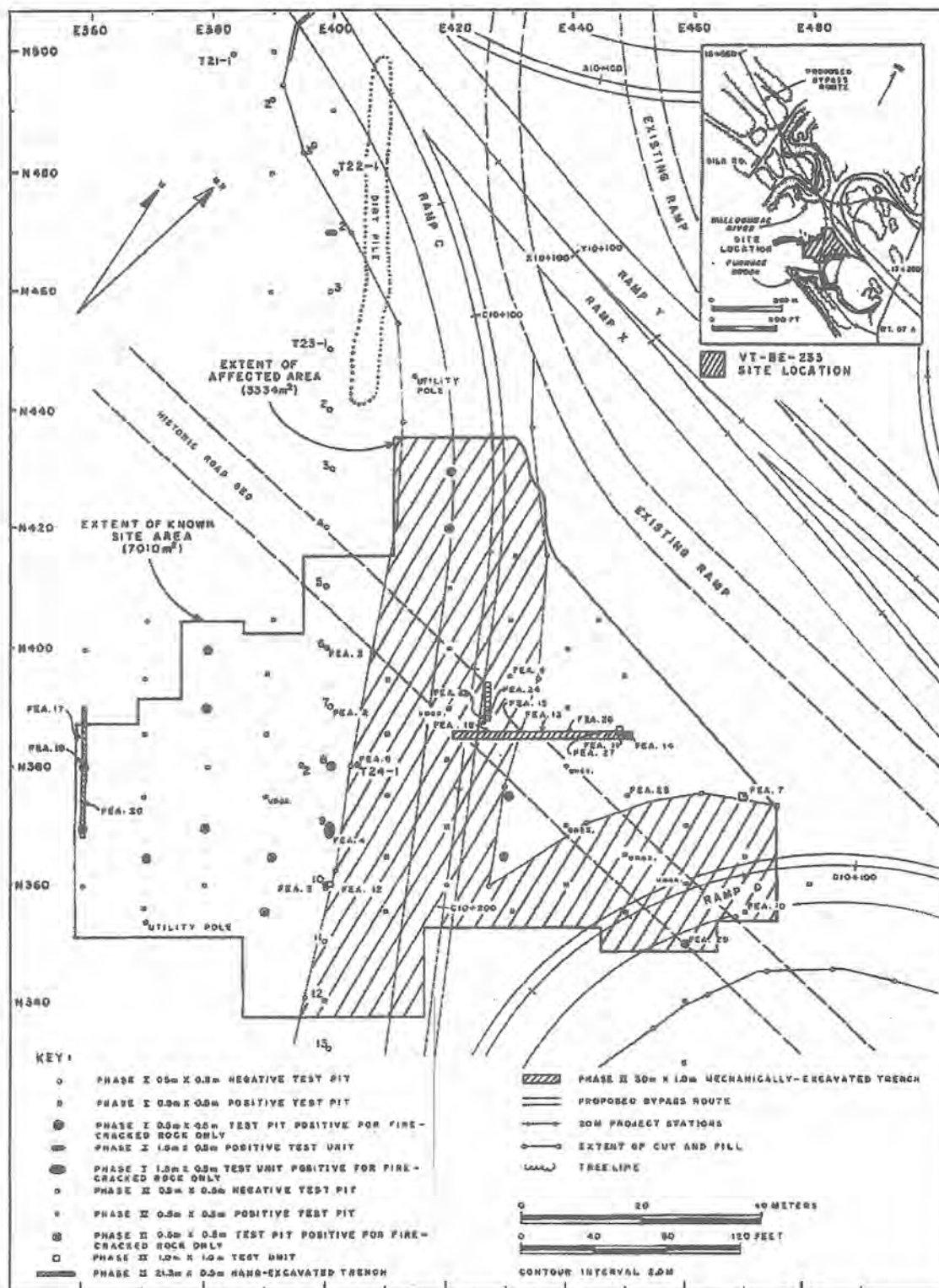


Figure 3. Schematic map of the general setting of the Cloverleaf site on the Walloomsac River. Note location of initial phase I survey transects, T21-T24, phase II test pits, units, and trenches, and features identified in 1995 and 1996 as well as extent of known site area and extent of affected area.

site, probably related to the junkyard. Of the 31 (or 7%) historic artifacts recovered from the southeastern portion of the site, where the Native American deposits are concentrated, all but one were recovered from the plow zone. None of these were considered significant, however, given their disturbed contexts and relatively recent origin. Some of these artifacts were likely associated with the former historic structures that were present in the area, especially those related to the Green Acres development.

The identification of cultural features demonstrated a high degree of integrity at the Cloverleaf site, and they seemed to provide significant evidence of short-term Native American activities. No immediate evidence of their age was recovered, however and the age of the site remained uncertain. Nonetheless, the presence of at least five intact cultural features led to a determination that the site was likely significant even though it could only be attributed to general Native American prehistory.

On the basis of the phase I survey, archaeological phase II testing was recommended at the Cloverleaf site to further assess its size, structure, context, age, and significance, to determine its eligibility for inclusion in the National Register of Historic Places (NRHP). Specifically, further investigation of the features and possibly related sediment was recommended to better define their context and to determine whether one or more buried surfaces were present at the site. It was one of the most significant sites identified during the phase I survey of the Bennington Bypass Project on the basis of its cultural features and overall integrity (Cox et al. 1997b).

Archaeological phase II testing was conducted at the Cloverleaf site in mid-late July, 1996, and included the excavation of a combined area of 18 square meters and 16.78 cubic meters of site sediment through controlled hand excavation of fifty-nine 0.5 m by 0.5 m test pits and three and one-half 1.0 m by 1.0 m test units (see Figure 3). In addition to the test pits and units, three stratigraphic trenches were coarsely excavated. Two were hand excavated and one was mechanically excavated, resulting in an additional 45.85 square meters of site sediment being excavated.

Archaeological phase II field work began with the establishment of a horizontal metric grid on a magnetic bearing of 325 degrees along phase I sampling transect T23, using a total station and prism. All phase II excavations were located in relation to this grid. The majority of the test pits were excavated at 10 m intervals along the following grid lines, E360, E370, E380, E390, E410, E420, E430, E440, E450, E460, and E470. Phase I excavations were relocated in relation to the grid as well. In addition to the horizontal grid, an arbitrary vertical grid was established and all excavations were conducted in relation to a site-wide metric elevational system.

The 59 phase II test pits were excavated to an average depth of 94 cm below the ground surface. The larger 1.0 m by 1.0 m test units were placed adjacent to and/or encompassed positive test pits, as well as a limited portion of the mechan-

ically excavated trench, in order to better define the horizontal and vertical distribution of the cultural deposits. The stratigraphic trenches provided a relatively broad examination of the distribution of cultural remains, as well as exposed site-wide sediment profiles in both north-south and east-west directions. The maximum depth of the test units and trenches varied due to different circumstances. At the termination of the phase II excavations, three sediment column samples were taken from various locations across the site. Two of these sediment columns were ultimately processed at the University of Wisconsin-Milwaukee, along with several radiocarbon samples processed by Beta Analytic, Inc.

As a result of the phase II testing at the Cloverleaf site, a total of 2,469 Native American lithic flake (debitage) specimens were recovered, along with 22 lithic tools. Although none of the tools were clearly diagnostic, it initially seemed that one or more of the biface tool fragments might be best related to one or another Late Archaic period manifestation, ca. 4000-1000 B.C., in its full duration. An additional 243 fire-altered rocks and carbonized floral remains were recovered as well. Unequivocal Native American cultural remains were recovered from 26 of the 59 test pits and all three larger test units. Finally, a total of 560 historic Euro-American artifacts were also recovered during the phase II testing.

During the phase II field work in 1996, 21 cultural features were newly identified and one feature identified previously during the phase I survey (feature 5) was investigated further (see Figure 3). On the basis of the phase II testing, the Cloverleaf cultural deposits covered an area of at least 7,010 square meters, or roughly 1¼ acres. Notably, the majority, if not all, of the features are likely attributable to one or another Late Archaic period occupation(s) of the landform, although some of these may be natural, rather than cultural, in origin. Of the 22 total features documented during the phase II testing, ten were identified during the excavation of test pits or test units, while the remaining features were identified in the wall profiles of the stratigraphic trenches. Sediment was collected from 14 of these features during the phase II field work for subsequent processing in the laboratory.

The distribution of the cultural features is widespread at the Cloverleaf site as seen in the phase II testing. Carbonized floral remains from seven of the cultural features were submitted for archaeobotanical analyses and subsequent radiocarbon dating. The results indeed documented a Late Archaic attribution for the site, with dates ranging between ca. 2030-1640 B.C. (3980-3590 B.P.).

The archaeological phase II testing strongly confirmed the significance of the Cloverleaf site and its eligibility for NRHP. After extended discussions with the Vermont Agency of Transportation (VAOT), it was determined that the proposed highway project could not avoid disturbance of at least a significant portion of the known site area. During a meeting in April, 1997, attended by personnel from the UMF ARC, the VAOT, the VDHP and the FHWA, a decision was made to



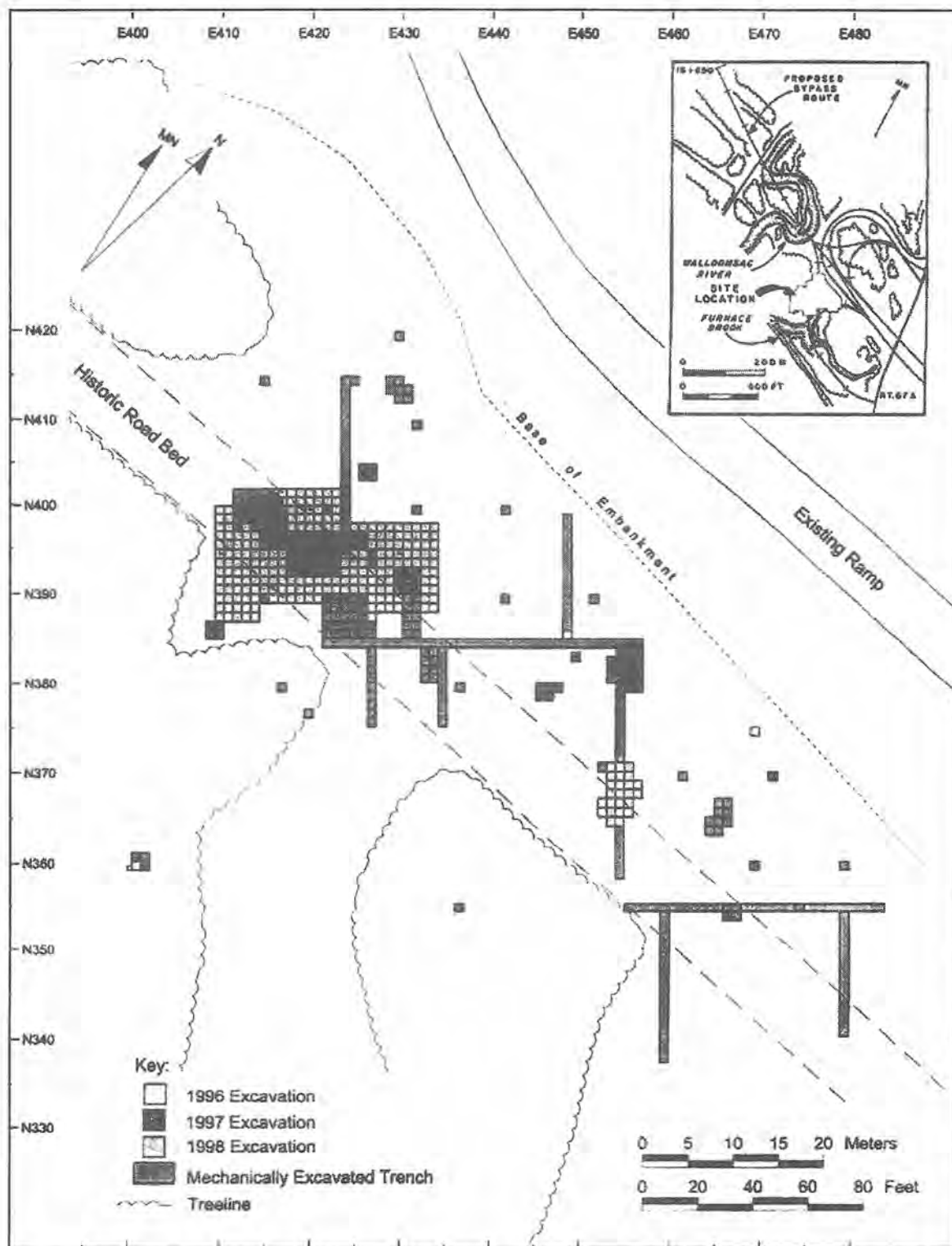


Figure 4. Detailed plan view showing location of select phase I and phase II test pits, and all phase II test units and phase III data recovery excavations conducted at the Cloverleaf site.

proceed with preliminary data recovery excavations of at least a 5% intuitive sample (167 square meters) of the area to be affected by the proposed project (Petersen et al. 1997). At that meeting the VDHP suggested additional excavations beyond the 5% sample might be necessary. Subsequent negotiations led to additional data recovery excavations of another 2.5% sample of the Native American deposits within the area of potential effect at Cloverleaf (Cowie et al. 1998b).

The UMF ARC ultimately conducted phase III data recovery excavations at the Cloverleaf site in the late summer and fall of 1997 (August-October), and additional mitigation work was conducted the following year in 1998. An overall total of 450.25 square meters of site sediment has been excavated at the Cloverleaf site as a result of the cumulative investigations there (Figure 4). This total includes mitigation of roughly 12% of the area to be affected by the proposed bypass project.

The southern, eastern, and western boundaries of the site were relatively well defined as a result of the phase II testing conducted by UMF in 1996, along with the previous phase I investigations conducted by the UVM Consulting Archaeology Program (CAP). However, the northern boundary of the site still had not been clearly established after the 1996 field work because it remained unknown whether cultural deposits extended underneath portions of the existing interchange (Petersen et al. 1997; Thomas et al. 1980). Additional phase II testing work within the area of the interchange was conducted in 1997 to establish the northern boundary of the site and the negative results from that study suggest that cultural deposits do not extend, or survive, within the interchange area.

The horizontal grid established during the phase II testing was reestablished using a total station at the initiation of the phase III data recovery excavations. All phase III excavations conducted over the entire site were located in relation to this grid. In addition, the arbitrary elevational datum established during the phase II field work was relocated and used to facilitate site-wide elevational correlation.

In 1997, the phase III field work began with the excavation of 30 square meters of carefully hand-excavated 1.0 m by 1.0 m test units to sample relative artifact densities across the site. In these initial 30 square meters, upon identification of Native American cultural material, the sediment from the northeast quadrant of each test unit was screened through 1/8" mesh hardware cloth, in addition to the regular 1/4" mesh, to determine whether small fragments of burned bone, charcoal, lithic flakes (debitage) or Native American pottery were represented. Although smaller specimens of lithic debitage were recovered from the 1/8" mesh, no other cultural remains were recovered as a result of this methodology. Varying excavation techniques and methodologies were utilized for the remaining excavations planned for 1997, allowing efficiency and flexibility during the field work. These included, but were not limited to, excavating the plow zone as a single stratigraphic unit, as well as abandoning 1/8" mesh screening of

non-feature sediments and, in certain cases not screening the plow zone where Native American material was known to be quite deep. Of the 209 square meters excavated in 1997, 171 were situated within the proposed project impact area and 38 were beyond the extent of impact (see Figure 4).

In 1998, various excavation techniques and methodologies were again employed at the Cloverleaf site during the second round of phase III field work. These included stripping (both by hand and mechanically by backhoe) and non-screening of the uppermost, disturbed historic roadbed and plow zone deposits. In addition to hand excavations, nine roughly one-meter wide trenches were mechanically excavated by backhoe to enable stratigraphic interpretations across the site. Dr. G. Robert Brakenridge, a geomorphological consultant, visited the site several times over the course of all the archaeological investigations at the site. Brakenridge examined the sediment profiles in the trenches, as well as in several of the test units. This work has contributed greatly to our understanding of the alluvial history of the site area. Ultimately, an additional 217 square meters of site sediment was excavated in 1998; this was all situated within the area of potential effect (see Figure 4).

At the termination of the 1997 phase III excavations, 10 sediment column samples were taken from several of the test units and trenches. Six of these were subsequently processed at the University of Wisconsin-Milwaukee, as were soil samples taken from the buried cultural horizon that spans the site. Also, several radiocarbon samples were processed by Beta Analytic, Inc.

Ultimately, a combined total of 450.25 square meters of site sediment was excavated at the Cloverleaf site during all phases of field work, but not including the stratigraphic trenches (Figure 5). A total of eighty 0.5 m by 0.5 m test pits (two of which were expanded into larger 1.5 m by 0.5 m test units) and 429 1/2 1.0 m by 1.0 m test units were excavated.

A total of 105,120 unequivocal Native American artifacts were recovered from the Cloverleaf site during the archaeological phase III data recovery. A combined total of 108,081 Native American artifacts have been recovered as a result of the cumulative archaeological investigations and 125 cultural features have been identified and documented.

Large quantities of feature sediments were processed in the laboratories at UMF. Floral remains dominate in these features and detailed analyses are resulting in one of the more significant data sets for Late Archaic plant use in northern New England. Unfortunately, preservation of faunal material is limited to a very small number of poorly preserved calcined bone fragments. Given the intensive recovery techniques employed, factors of preservation and cultural disposal practices are likely important factors involved with the paucity of faunal remains.

Of the total Native American artifact inventory, roughly 69,000 (64%) are lithic flakes, or debitage, 38,000 (35%) are fire-altered rocks, and the remaining 922 (<1%) are lithic tools and tool fragments. The lithic tools can be further subdivided





Figure 5. Overview of ongoing 1998 data recovery excavations at the Cloverleaf site, facing south. Note blocks of previously excavated 1997 units within 1998 excavation block.

into a flaked stone category, which totals 898 (or 97% of the tool assemblage) and ground and/or pecked stone, which totals 24 (3% of the assemblage). Ninety-six percent of the debitage sample and 75% of the tool assemblage are made of locally available gray quartzite. The remaining 4% of the debitage sample and 25% of the tools are composed primarily of non-local New York State cherts.

Of the 898 flaked stone implements, 244 (or 27%) are crude bifaces, 271 (30%) are later stage preforms, 167 (19%) are projectile points and point fragments, 156 (17%) are utilized flakes, 43 (5%) are edge retouched flakes, and the remaining 17 (2%) represent cores, flaked cobbles, a drill, a chopper, and a scaled piece.

The projectile point assemblage includes at least 124 Normanskill-type points, of which 64 (or 52%) are complete or nearly complete (Figure 6) (Ritchie 1971:37-38). Interestingly, although the overall tool assemblage was mainly manufactured from quartzite, 101 (60%) of the projectile points are New York State cherts. Only 59 (35%) of the points are quartzite and the remaining 7 (5%) include quartz, basalt and other unidentifiable materials. Groundstone implements include a large (approximately 68.5 cm long by 15 cm wide by 6.3 cm thick) bifacially flaked preform, which was found in two pieces in a pit feature, a wing fragment of an atlatl weight, a possible pendant fragment, and a tool edge fragment (Figure 7).

Historic Euro-American remains (5,774 specimens) were also recovered during the phase III data recovery, but again none were from *in situ* deposits or structural remnants, and they are not considered significant.

The vast majority of the Native American cultural remains were recovered from a buried surface, or paleosol, which is evident across the site. The paleosol occurred at varying depths of 10 cm to 150 cm below the ground surface. However, a very small number of Native American artifacts were recovered from overlying sediments as well.

Based on examination of the sediment profiles revealed in the stratigraphic trenches, six strata were defined at the Cloverleaf site, generally reflecting the site-wide stratigraphy. The strata were designated stratum I through stratum VI, with stratum VI being the uppermost. These are described sequentially here from the uppermost downward.

Stratum VI is the uppermost stratum identified at the site and represents the overburden, or roadfill, of the existing (but long abandoned) historic LeBlanc Avenue related to the Green Acres development. Stratum VI overlies stratum V (where V has not been entirely removed) and it has a maximum thickness of 64 cm.

Stratum V underlies stratum VI (where VI is present) and it represents a historic plow zone, or "Ap" horizon. Stratum V was present across the site, except in cases where it was seemingly removed or reworked to incorporate fill as mentioned above. Its thickness is somewhat irregular given historic activities and it consists of a dark brown to dark yellowish brown silty loam. Where present, stratum V extends from 10 to 55 cm below the ground surface.

Stratum IV underlies stratum V where present, although it was not identified consistently across the site. Also, in some cases, stratum IV and underlying stratum II are indistinguishable from each other where stratum III (which represents a

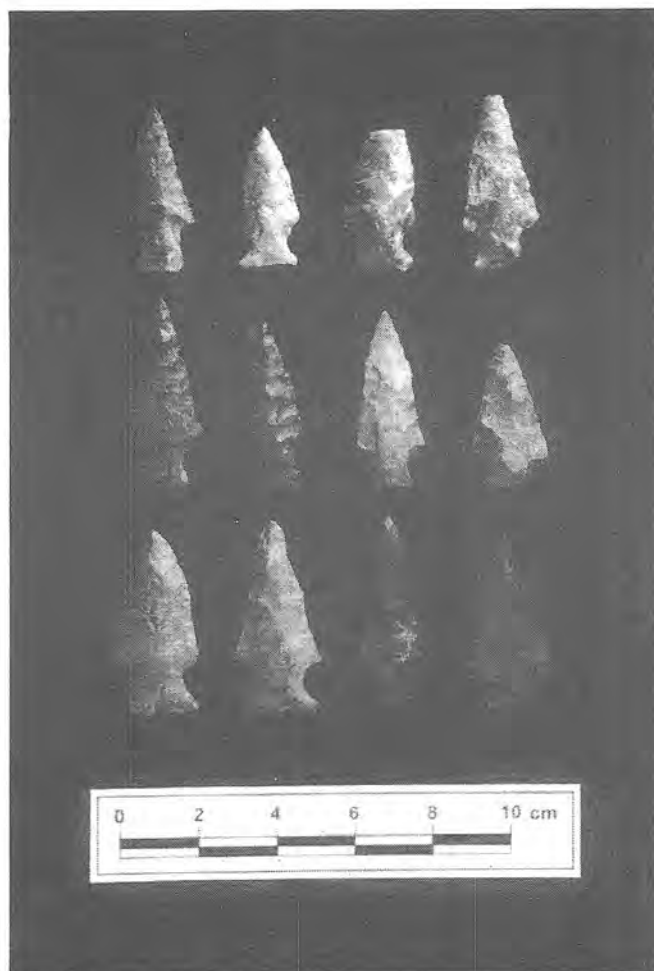


Figure 6. Twelve Normanskill-type projectile points and point fragments (top to bottom, left to right: provenience numbers 1705-1, 7356-1, 12776-1, 13823-1; 5454-1, 13901-1, 13923-1, 12273-1; and 11940-1, 3105-4, 13563-1, 3056-1) recovered from the Cloverleaf site during the phase III data recovery excavations.

paleosol, or ancient surface) is absent or otherwise disturbed. So, they were sometimes mapped as a single, homogenous stratigraphic unit. In any case, stratum IV consists of a dark yellowish brown to yellowish brown silty loam to loam, and ranges from 5 cm to 65 cm in thickness; it most likely represents alluvial deposits of late Holocene age, largely post-dating the major site occupation. In some cases, stratum IV also exhibited the remnants of one (or more) discontinuous buried surfaces. These lenses of darker sediment occurred sporadically across the site landform and were sometimes assigned feature numbers and excavated as such, although very scant Native American cultural remains were gleaned from them, apart from carbonized floral remains.

Stratum III underlies stratum IV in almost all cases, but



Figure 7. Three lithic groundstone specimens recovered from the Cloverleaf site during the phase III data recovery excavations. Top left: provenience number 13832-2, pendant fragment; bottom left: provenience number 14612-1, atlatl weight wing fragment; and right: provenience number 9939-1, tool edge fragment.

was identified directly below stratum V in a few places, as noted above. Like stratum IV, stratum III was not identified consistently across the site. It consists of dark brown to dark yellowish brown loam to silt loam and ranges from 4 cm to 28 cm in thickness; it represents a paleosol, or ancient surface upon which the major site occupation occurred (Figure 8). The vast majority of the Native American artifacts originated within stratum III. In addition, various features located along this surface have been radiocarbon dated to the Late Archaic period, as described below.

Stratum II underlies stratum III in some cases, although sometimes it was indistinguishable from stratum IV, as noted above, and so, in those instances, they were mapped as a single homogeneous stratigraphic unit. Stratum II consists of dark



Figure 8. View of the north wall of phase III excavation block along N402 line between E416-423 at the Cloverleaf site. Note crewmember pointing to Late Archaic surface, or paleosol and range pole marked in 20 cm increments.

yellowish brown and yellowish brown to light olive brown silty loam to very fine sandy loam with some lenses of medium to coarse sand and ranges from 20 cm to 55 cm in thickness. Like stratum IV, stratum II represents alluvium and includes a number of flooding episodes.

Stratum I was not encountered in all excavations and where present, it occurred at widely varying depths of 20 cm to 130 cm deep. It consists of variably colored loamy sand to fine, medium and coarse sand, with some gravel, pebbles, and cobbles. Stratum I likely represents basal riverine sediments, but may also be comprised of deflated glacial till, at least in part.

As a result of the cumulative archaeological investigations at Cloverleaf, a total of 150 feature designations were assigned. Of this number, only 125 can be confidently attributed to Native American activity at the site. The remainder of the features represent rodent burrows, historic disturbance of site sediments, and portions of one (or more) other paleosols beyond that which is related to the Late Archaic occupation. Of the 125 cultural features that are unequivocally attributable to the Native American occupation, 21 simply represent portions of the culturally enhanced paleosol (stratum III). The remaining 104 features are comprised of fire and/or cooking hearths, storage and/or refuse pits, post molds, lithic concentrations, large pit or trench-like features of unknown function, and a large roasting pit, feature 59, which ultimately measured roughly 5.0 m by 3.0 m (16 ft by 10 ft) when fully exposed (Figure 9). Of the 38,000 fire-altered rocks recovered from the Cloverleaf site, nearly 22,000 (or 58% of the total) were recovered from feature 59. Also, other features were associated with the outer edges of this large roasting pit, including storage pits and post molds (features 61-63, 65, and

69-71).

Carbonized floral remains from 34 of the cultural features, including two samples from the paleosol itself, were submitted to Nancy Asch Sidell for archaeobotanical analysis. Eighteen wood species were identified among these samples. Beech was the most prevalent species; roughly 40% of the floral samples analyzed are beech wood. Other wood species identified include elm, maple, ironwood, ash, and birch, among others. Butternut shell fragments were found in 24 (71%) of the analyzed samples and hazelnut was found in 11 (32%). In addition, a single storage and/or refuse pit, feature 136, also included acorn, bitternut hickory, and hickory nut. Pit feature 29 also contained beechnut, so it seems that the Cloverleaf inhabitants were utilizing nearly all available nut species in the area (except perhaps chestnut) for food. A high incidence of rhizomes/tubers was also noted in many of the features (17, or 50%), although, given the small fragmentary nature of the specimens analyzed thus far, the rhizome type(s) represented remains uncertain. A number of seed types have also been identified in the floral samples analyzed so far. These include bedstraw, smartweed, pin cherry, hawthorn, and hog peanut.

Subsequent to the archaeobotanical analysis, 15 of the floral samples were sent to Beta Analytic, Inc. for conventional radiocarbon dating. Ten of the floral samples, representing portions of the culturally enhanced paleosol associated with the T2 terrace (stratum III), and several of the features that originated within it, returned dates that indicate a range of occupation spanning between 70-350 years at one standard deviation. This date range (uncalibrated) extends from 2070-1860 B.C. (4020-3810 B.P.). Furthermore, at two standard deviations all ten dates overlap, suggesting (with 95% reliability) that these features were likely all utilized at



Figure 9. Plan view south of fully exposed top of feature 59 roasting pit in N397-402 E411-417 excavation block at the Cloverleaf site. Note range poles marked in 20 cm increments.



essentially the same time, during the River phase of the Late Archaic period (Table 1)

A radiocarbon date of 2640 B.C. (4590 B.P.) was returned for an apparently non-cultural burn episode (feature 57), which was located vertically within stratum II and well below the stratum III paleosol. No artifacts were recovered from this feature beyond the charred floral remains and thus it is not considered cultural in origin. The radiocarbon date obtained suggests that this natural feature was emplaced during the latest phase of the Laurentian tradition, the Vosburg phase, which has been dated elsewhere to ca. 3400-2500 B.C. (Funk 1976; Funk, Walters and Scott 1971; Ritchie 1958, 1965, 1969:83-84).

Two radiocarbon dates obtained on other cultural features at the site (features 5 and 40) are apparently related to a younger portion of the Late Archaic period, possibly the Snook Kill phase of the Susquehanna Tradition, ca. 1700-1600 B.C. Both of these features are located near the southern margin of the site somewhat distant horizontally from the most dense cultural deposits where nearly all the remains are assigned to the River phase.

One other date obtained on floral material from feature 72, located at the southern margin of the site within stratum IV, is attributed to the Early Woodland period, ca. 1000-100 B.C. This date is attributable to a paleosol associated with the more recent alluvial terrace (T1) and is present in some site areas, particularly towards the southeastern portion. However, no cultural material has been unequivocally associated with this later paleosol (Cowie et al. 1998a).

### Preliminary Correlates and Implications

When taken together, the radiocarbon dates and the diagnostic projectile point assemblage, including at least 124 Normanskill type points or point fragments, document that the majority of the Native American occupation at the Cloverleaf site is attributable to the River phase. This little known Late Archaic period phase was first defined by Ritchie using a limited number of sites in the lower Hudson and Mohawk river valleys in New York State, including the River site, from which the phase takes its name, the Bent site and the Hoffman's Ferry site (Ritchie 1958, 1965). In fact, before our work in Bennington the River phase was previously known only from the Hudson River drainage in New York (and perhaps Massachusetts?) (Funk 1976:255-258). So, this attribution makes the Cloverleaf site decidedly unique in both local and in broader northeastern North American contexts.

The Cloverleaf site seemingly represents one of the best-preserved essentially single component sites of the Late Archaic period in the region, although several archaeological sites excavated in nearby New York State exhibit River phase components (Ashton 1990; Funk 1976; Ritchie 1958, 1965; Ritchie and Funk 1973). Two of these sites, Bent and ABC, are larger than the 1¼ acre Cloverleaf site at 5.0 acres and 3½ acres, respectively. Other archaeological sites with River phase deposits are considerably smaller in size, indicating perhaps that they were occupied only seasonally by relatively small groups of people. These include the Pickle Hill (½ acre) and

Table 1. Radiocarbon Dates (Uncorrected) and Associated Provenience Data From the Cloverleaf Site.

Radiocarbon Date (yrs B.P.)	Lab No. (BETA)	UMF-ARC PN No.	Material Dated	Associated Materials	Feature No.	Feature Function	Unit	Stratigraphic Position
600 ± 50	103373	445	Sugar Maple	Ash, Beech, Butternut, Fungi, Unidentified Wood Bark, Pitch	15	Pit/Gully	N385 Trench	III
2480 ± 80	112489	3551	Unidentified Wood	Birch	72	Burn Episode	N354 E465	IV
3590 ± 70	100216	370	Unidentified Wood, Bark	Beech, Birch, Elm, Hazelnut, Ironwood, Maple, Poplar, Sugar Maple	5	Pit/Gully	N360 E400	III
3650 ± 90	112484	7045	Beech, Ironwood, Unidentified Wood		40	Hearth	N355 E468	III
3810 ± 70	112490	2763	Unidentified Wood	Beech, Butternut, Cherry, Elm, Bedstraw Seed, Hawthorn Seed	81	Roasting Pit	N383 E455	III
3820 ± 80	103172	444	Ash, Basswood, Beech, Elm, Hornbeam, Unidentified Wood, Bark	Butternut, Unidentified Wood, Bedstraw Seed, Fungi	13	Hearth	N385 Trench	III
3890 ± 60	103171	337, 340, 381	Ash, Beech, Ironwood, Unidentified Wood, Pitch, Bark	Butternut, Hazelnut	14	Pit/Gully	N386 E449	III
3900 ± 70	112483	2376	Unidentified Wood	Beech, Birch, Elm, Ironwood	33A	Hearth	N389 E431	III
3910 ± 80	112486	1729	Unidentified Wood	Beech, Butternut, Hickory, Ironwood, Bark, Pitch	52A	Storage/Refuse Pit	N400 E413	III
3940 ± 60	103173	447	Unidentified Wood, Bark	Ash, Beech, Sugar Maple	16	Paleosol	N385 Trench	III
3940 ± 80	103170	334	Beech, Maple, Ironwood, Red Oak, Sugar Maple, Unidentified Wood, Bark, Pitch	Butternut	11	Hearth	N386 E449	III
3950 ± 80	112485	2678	Unidentified Wood	Beech, Butternut, Ironwood, Bark	43	Roasting Pit	N382 E455	III
3980 ± 50	103372	297	Beech	Beech, Hazelnut, Unidentified Wood	12	Rock Concentration	N360 E401	III
4020 ± 70	112488	4261	Unidentified Wood	Beech, Butternut, Cherry, Hickory, Ironwood, Bark, Unidentified Seed	59	Roasting Pit	N401 E414	III
4590 ± 90	112487	1274, 1504, 1505, 1507, 1508	Birch, Elm, Butternut, Unidentified Wood	Beech	57	Burn Episode	N406 E424	II

River sites ( $\frac{1}{8}$  acre), among others (Ritchie 1958; Weinman et al. 1967).

Unfortunately, very little information is available concerning excavations at the ABC site, which is situated in Washington County, New York (Ashton 1990). Conversely, much has been written about the Bent site, which was excavated in 1960 and 1961, along with several years of avocational collecting activities that took place in the general area (Ritchie and Funk 1973). In any event, the overall area excavated at the Bent site totaled roughly 270 square meters (1.3% of the total site area), as compared with 450 square meters excavated at the Cloverleaf site (6.5% of the total site area). Just one other site has been more thoroughly excavated, the Lauder site, located near the confluence of Black Creek and the Battenkill River in Washington County, New York. A total of 107 square meters was excavated at the Lauder site in 1970, resulting in a 75% sample of the site, which totals 142 square meters in overall extent (Ashton 1990).

Comparison of artifact assemblages, cultural features, and radiocarbon dates from the above-mentioned sites with the Cloverleaf site reveals similarities in terms of the activities that took place at each site. Production and/or use of Normanskill type projectile points seems to have been a major focus of activity at all of these sites. By far, the site with the highest number of Normanskill projectile points is the Bent site ( $n=237$ ), followed by the River site ( $n=152$ ), Cloverleaf ( $n=124$ ), Lauder ( $n=30$ ), and Pickle Hill ( $n=19$ ). The ABC site also reportedly produced "...hundreds of Normanskill points." (Ashton 1990:8). In all cases, including the Cloverleaf site, the primary materials used to manufacture these points are gray, black and green cherts, including Normanskill, Deepkill, Little Falls and Onondaga raw materials from various locales in the Hudson Valley of New York State (Ashton 1990; Funk 1976; Ritchie 1958, 1965; Ritchie and Funk 1973). It is assumed that the lithic debitage samples from the New York sites reflect this fact, but little information is available concerning the raw material type(s) of the debitage inventories from any of these sites except Lauder, which is a quarry and workshop site (Ashton 1990). On the other hand, the Cloverleaf site debitage sample is composed primarily of quartzite ( $n=66,446$ , or 96% of the total), which is locally available in the form of cobbles in the bed of the Walloomsac River, as well as from many nearby outcrops situated along the western flanks of the Green Mountains.

At the River site, several of the projectile points were from quartzite. It was presumed that this material originated "...either from local glacially transported boulders or from ledges in the Adirondack Mountains..." (Ritchie 1958:46). Quartzite was also used in tool manufacture at the Lauder site (Ashton 1990). It now seems likely that the quartzite material at these sites may possibly have been procured in nearby Vermont, as did one specimen of black felsite from the River site (Ritchie 1958:46).

The manufacture and use of groundstone tools was

seemingly equally important to flaked stone tools at the Bent site where roughly 435 groundstone specimens were recovered. This number includes netsinkers ( $n=102$ ), abraders ( $n=76$ ), atlatl weights ( $n=50$ ) and pestles ( $n=15$ ), among others (Ritchie and Funk 1973:56-65). At the other four River phase sites in New York State and Vermont, groundstone manufacture or use was seemingly not as intense. At the Cloverleaf site, for example, 24 groundstone specimens, representing 17 implements, were recovered. These included abraders ( $n=4$ ), hammerstones ( $n=4$ ), adzes ( $n=2$ ) and groundstone preforms ( $n=5$ ), along with a pendant fragment and an atlatl weight wing fragment. The large bifacially flaked groundstone perform mentioned above bears a remarkable similarity to the "effigy pestle in process" from the Bent site (Ritchie and Funk 1973: 68, Figure 4). The River site revealed only one netsinker and two adzes, while Lauder had just one netsinker and one pestle fragment, and the artifact inventory from Pickle Hill contained no evidence of groundstone implements whatsoever.

The set of 125 cultural features defined at the Cloverleaf site is by and large one of the densest of any River phase sites excavated to date, although the Bent site also had relatively dense features ( $n=30$ ), given the lesser amount of excavated site sediment there (Ritchie and Funk 1973). At the Lauder site, nine features were identified and at Pickle Hill two features were defined (Ashton 1990; Funk 1976). Evidently, no features were encountered at the River site (Ritchie 1958). Large roasting pits for processing locally available nut species were defined at all four River phase sites that produced cultural features. These features were oval to circular in plan view and were similar in both size and content (Ashton 1990; Funk 1976; Ritchie 1965; Ritchie and Funk 1973). The Bent site and Pickle Hill produced evidence of acorns in the floral samples recovered from these large, shallow stone-lined pit features. Although some acorn has been recently identified from Cloverleaf, butternut and hazelnut are by far the most ubiquitous nut species represented in the floral sample there (Cowie et al. 1998a). Other feature types encountered at Bent and Lauder include fire hearths, storage and/or refuse pits, and areas of burned soil. In addition, several possible postmolds were identified at the Bent site, as was a large circular pit of unknown function, seemingly similar to those defined at Cloverleaf (Ritchie and Funk 1973:55).

## Concluding Summary

The Cloverleaf site is the only unequivocal River phase site identified in the State of Vermont to date. The near single component nature of the Cloverleaf site, in addition to the extensive and intensive excavations conducted there, make it one of the most well documented Late Archaic Native American habitation sites in Vermont, and a large portion of northeastern North America.

Intriguing relationships emerge when subsistence and settlement patterns revealed at the Cloverleaf site are



compared with those of other known River phase sites in the Hudson River Valley. Similarities between the Cloverleaf assemblage and the Bent and River assemblages, among others in New York State, indicate a far more extensive travel and/or trade network than previously assumed for this time period. Given the high incidence of discarded projectile points fashioned from New York chert materials and the conversely low occurrence of debitage of these materials, it seems likely that these tools were brought to the site in finished form. Conversely, the low numbers of finished quartzite points encountered, combined with the relatively high density of quartzite debitage recovered from Cloverleaf, indicate that the site occupants were intensively involved in replenishing tool kits, as well as harvesting and processing a variety of food items, minimally nuts, berries, and tubers. It is almost certain that hunting and perhaps fishing were carried out in the vicinity of the Cloverleaf site but no evidence of faunal subsistence remains were encountered, likely due to the relative acidity of the soils in the area. It is possible that the large roasting pits found at Cloverleaf and other River phase sites were related to fish processing. In any case, the relatively large size of the site seemingly suggests that a sizeable group of people were in residence there during the Late Archaic period. This is somewhat surprising in local contexts for this period and previews developments of the later Woodland period.

In sum, this article presents only preliminary results of excavations at the highly significant Cloverleaf site. Nonetheless, we can see that Cloverleaf has already contributed greatly to our understanding of Native American lifeways during this poorly known phase of the Late Archaic period. Additional results of ongoing analyses related to lithic materials, floral samples and distributional data from Cloverleaf will provide one of the most detailed looks at a relatively brief period of time (perhaps a single season of occupation) during the River phase.

### Acknowledgments

The authors wish to thank the numerous individuals, including dozens of paid field workers and well over 100 volunteers, who have contributed to this study thus far, without whom the amount of field work accomplished at this highly significant site would not have been possible. Various individuals also contributed to the laboratory work. The senior author served as field director for all episodes of field work, while the junior authors served as principal investigators and research directors. Robert N. Bartone aided the direction and management of the 1998 field work. He provided invaluable assistance in terms of excavation methodologies implemented and his knowledge and insight facilitated site interpretations. We are also indebted to Corbett Torrence and Geraldine E. Baldwin, both of whom contributed enormously to the work at Cloverleaf by conducting one of the most successful Public Education and Outreach efforts ever in northern New England.

Additionally, at UMF, Rosemary Cyr is thanked for her expeditious processing of artifacts, as are Shirley E. Thompson, Jeffrey A. Williams, William C. Crandall, Hutch M. McPheters and Daric L. Davenport, who contributed valuable computer assistance to the project. Also, Michael S. Brigham and Edward C. Kitson conducted analysis of the lithic tools and Hutch M. McPheters provided a flake (debitage) sample analysis. Jeffrey A. Williams also produced many relevant graphics for the site along with Tracy M. Martin and the senior author.

Alison B. Church and Steve Lynch, Project Engineers for the Special Projects Unit-Bennington Bypass and Mark O. Page are also thanked for their help in coordinating the smooth progression of the field work. They took great pains to address project-related issues as they arose and this contributed substantially to this study.

Emily Wadhams, Giovanna Peebles, and R. Scott Dillon of the Vermont Division for Historic Preservation, Mark Richter and K. Rob Sikora of the Federal Highway Administration, and Duncan Wilkie of the Vermont Agency of Transportation also deserve credit for facilitating all phases of field work through various means.

Recognizing that these and various others have provided valuable contributions to the ongoing research, thank you one and all. As is customary, however, the authors take sole responsibility for any errors or omissions herein.

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