Intensive Archaeological Evaluation for Selected Prehistoric Sites within the Highgate Falls Hydroelectric Project Area and Prehistoric Archaeological District

Submitted by:

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COMPLETED TO DECEMBER, 1982

Introduction

In December, 1982 a brief report outlining all archaeological work completed to that date was prepared and distributed to the Village of Swanton, the Federal Energy Regulatory Commission, the Vermont Division for Historic Preservation, Ronald Anzalone at the National Advisory Council and Lloyd Chapman of the National Park Service. This summary report has been incorporated in this document to provide the reader with a brief overview of two years of study and to act as an abstract for the more detailed supplemental report which constitutes the bulk of this document.

Reconnaissance Level Survey: Suunner and Fall, 1980.

In 1980 a reconnaissance level survey was conducted to evaluate the historic and prehistoric archaeological sensitivity of the Highgate Falls Hydroelectric Project area (see Figure 1). A detailed report describing this work was completed in March, 1981 (Thomas et al. 1981: pp 1-204, plus appendices). This report was subsequently submitted for both state and federal review.

Relying almost exclusively on the use of small test pits (n=485), a 5.5% physiographically stratified sample of roughly 100 acres within the probable area of direct impact was obtained. Based on this sample, a number of conclusions were reached. A brief summary of these conclusions is presented here.

1) The-proposed Highgate Falls Hydroelectric Project area has a high archaeological sensitivity. All large floodplains and low alluvial terraces which were sampled contain some evidence of prehistoric activity. There is a high probability, therefore, that sites exist in unsampled areas as well. At least 20-40 large site areas, which contain the remains of one or more occupations, are believed to exist along this 3.7-mile segment of the Missisquoi River. Some of the narrower riverine terraces also contain sites.

2) For those site areas identified in the project area (see Figure 2), the frequency and distribution of artifacts or cultural features within individual sites could not be determined. No sample of any site's contents larger than 0.002% had been acquired, while samples in the 0.0003% range were common for the larger site areas.

3) Due to this limited sample, very few temporally diagnostic artifacts **were** recovered. Fragments of pottery and a blank for a triangular projectile point indicated a post- A.D. 700 date for only one site.

4) The size and density of the clusters of artifacts which were encountered within individual site areas, as well as the contextual indicators from several localities, however, suggest that there is considerable functional variation among these sites. It is likely that both transient hunting-fishing-gathering camps and larger semi-permanent base camps or villages are present within the project area. Along the narrow alluvial terraces on the south bank of the river, for example, the distributions of artifacts seem to focus in areas as small as 30-by-30 meters. Such distributions may represent limited occupations by small groups of people. On the other hand, the largest

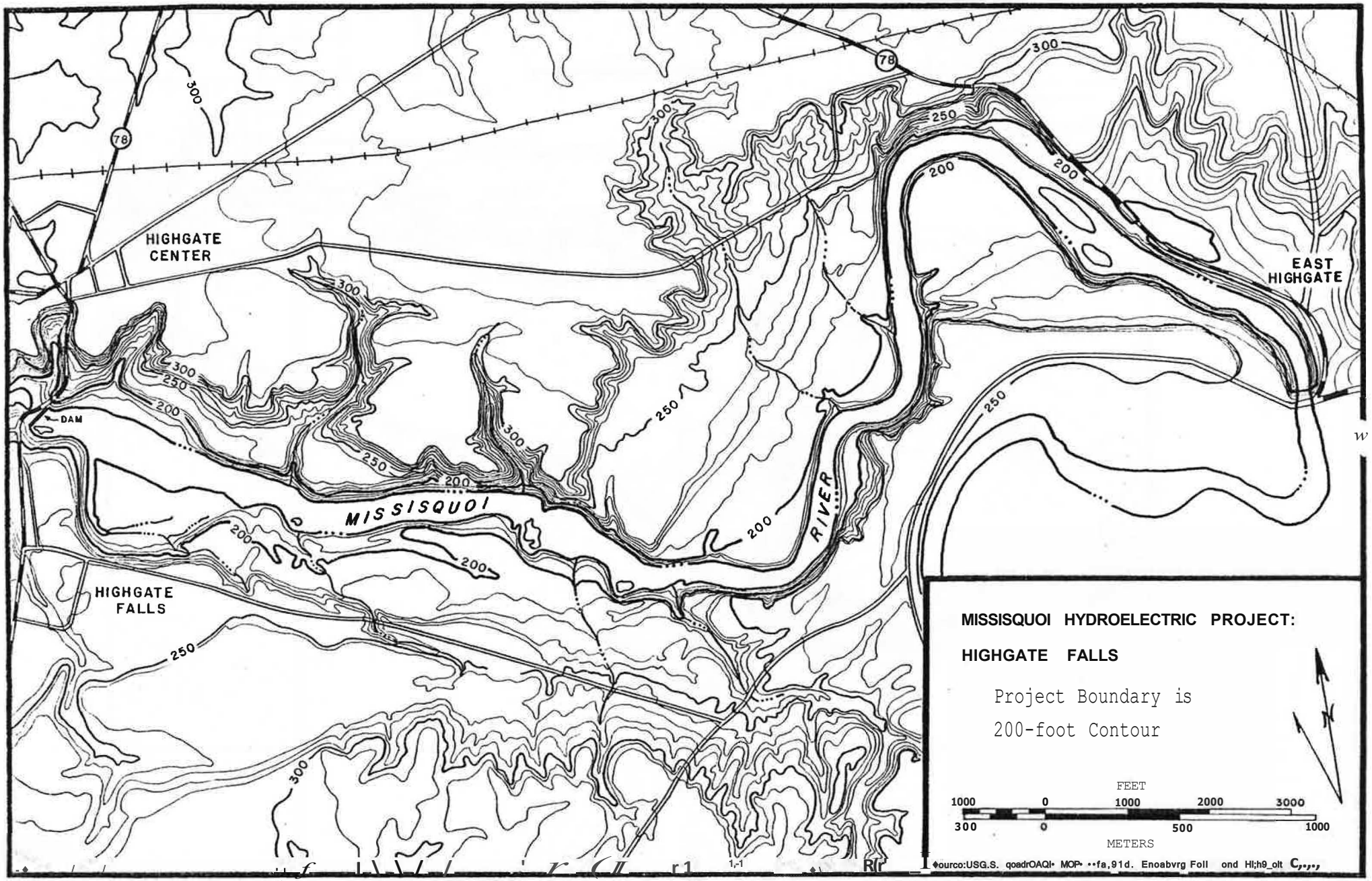


Figure 1. Highgate Falls Hydroelectric Project Area.

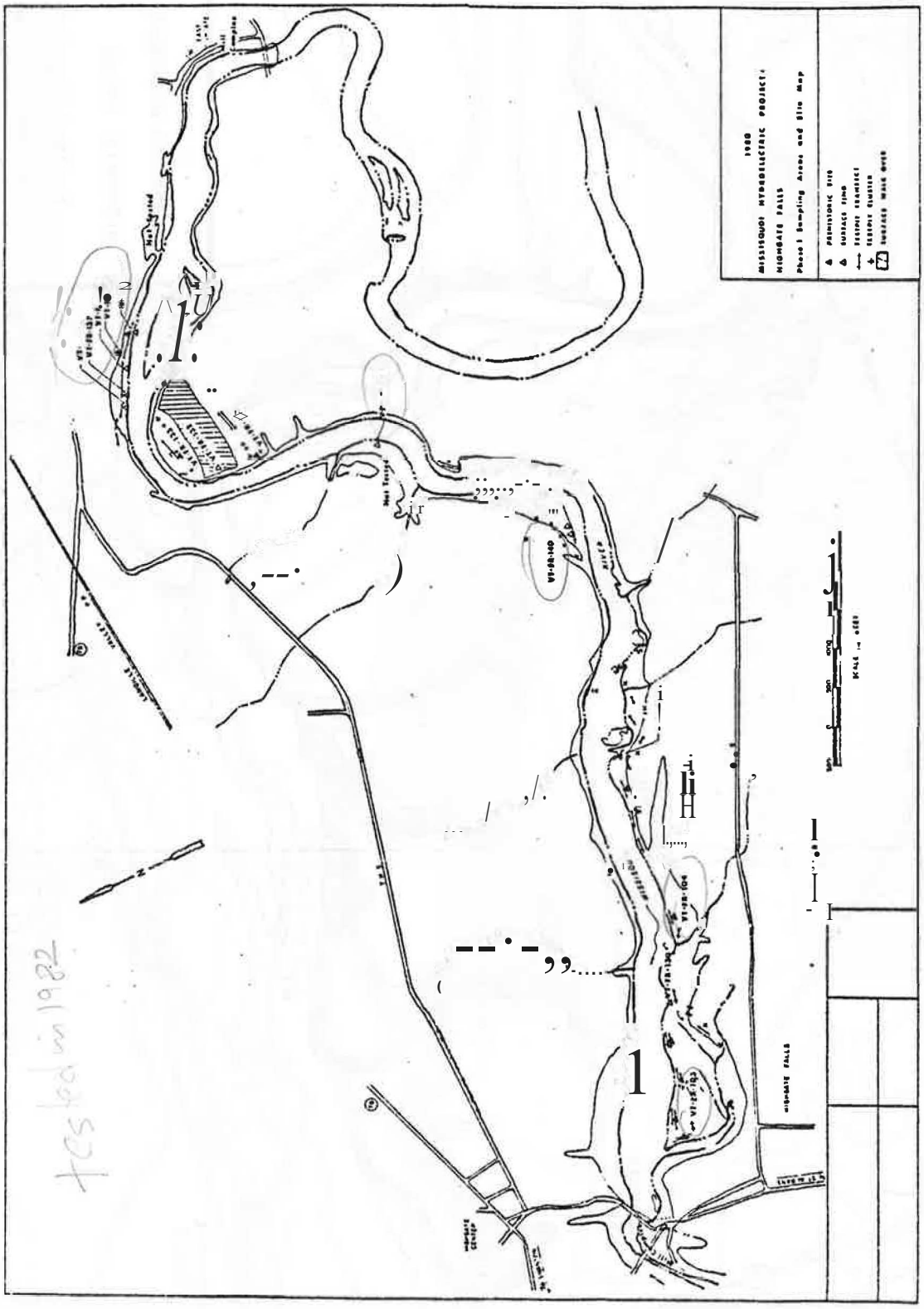


Figure 2. Phase I

artifact assemblages obtained from the test pit survey were recovered in the broad floodplains or broad low alluvial terraces. The percentages of culturally positive test pits in sample areas containing VT-FR-140 (46%), VT-FR-134 (50%) and VT-FR-103 (32%), for example, are among the highest yet documented for any locality in northwestern Vermont. For this reason, several portions of the floodplains or broad terraces where such dense deposits occur may contain substantial base camps or small seasonal villages.

Nomination of the Highgate Falls Prehistoric Archaeological District to the National Register of Historic Places: Winter, 1981-Spring, 1982.

Because of the high density and broad geographical distribution of prehistoric sites, the entire hydroelectric project area appeared to be a culturally significant unit of study. Documentation to determine National Register eligibility for the Highgate Falls Prehistoric Archaeological District was thus prepared by Giovanna Peebles, Staff Archaeologist, Vermont Division for Historic Preservation. The District nomination treated all identified site areas as a whole and included several hundred acres of unevaluated land as well. No attempt was made at that time to evaluate sites individually. It was anticipated that individual site assessments would be undertaken following the submittal of the FERC license application. In December, 1981, the District nomination was submitted to FERC by the Village of Swanton, along with their license application for construction of the hydroelectric facility. In March, 1982, FERC forwarded the District nomination to the National Register of Historic Places. In April, 1982, the National Register determined the District to be eligible. (All historic period sites identified during the background and reconnaissance field survey have been excluded from the District nomination.) The District boundaries include the entire Highgate Falls Hydroelectric Project area, as well as all additional land which lies below the 220' contour interval (see Figure 1). Statements concerning the District's significance follow.

The Highgate Falls Prehistoric Archaeological District is significant because it contains a range of prehistoric occupation/activity areas (in terms of size, structural complexity, data classes and topographic location) that have the potential of yielding information on spatial, functional, seasonal, and temporal relationships among Woodland /and probably Archaic period/ sites within a geographically restricted, environmentally homogeneous zone. The potential for understanding site differences and similarities (in function, site structure, season of use, size and temporal affiliation) within this limited stretch of riverine environment is great. Related and specific research questions that can be addressed include the following.

--Are there relationships between sites at different terrace levels and between terrace and floodplain sites?

--If significant differences among sites are found, what accounts for them in this environmental context?

--Do the larger floodplain sites reflect large communities of people or do they reflect the overlapping of smaller sites found on narrow terraces?

--If one assumes that riverine location is a function of subsistence benefits derived from this kind of setting, do the sites, in fact, reflect particular functions and seasons of occupation? More specifically, can we identify data categories that confirm functional relationships between the sites and this particular riverine orientation?

Answers to these questions will provide a comparative basis for evaluating other sites in environmentally similar, and dissimilar, segments of the Missisquoi watershed.

As a single unit of study, the District provides a cohesive, comparable body of data for evaluating similarities and differences in individual sites and site concentrations among environmentally distinct segments of the Missisquoi valley. With time and through thorough analyses of site clusters in different stretches of the watershed, information on human population size, on the size and characteristics of annual and seasonal exploitation territories, on seasonal activities and on trade and socio-economic networks utilized and maintained by past societies can begin to to compiled.

To date, only a minimal synthesis of available prehistoric archaeological data has been undertaken in the Missisquoi River watershed (Crisman 1981; Thomas and Robinson 1979; Thomas and Bourassa 1979). The Reagen Site, also in Highgate, and a number of fluted points in local collections suggest that human populations were exploiting this drainage between approximately 12,000 and 9,500 B.P. (years before £_resent). The presence of Early/Middle Archaic populations in the Missisquoi drainage was confirmed by studies at the John's Bridge Site, on the lower Missisquoi River in Swanton, yielding carbon dates of ca. 8,200 B.P. (Thomas and Robinson 1980). The lower Missisquoi drainage exhibits considerable evidence of Late Archaic occupations, some Early and Late Woodland, and extensive Middle Woodland period use. While human occupancy of the Missisquoi watershed from the river's mouth to thirty-fiye miles upstream shows considerable time depth, little is known about the sites themselves. Information on function, intra-site activity distributions, on seasonality and on temporal/functional patterning across the landscape, es ecially relative to specific environments in the drainage, is presently unavailable. Within the geographically limited, environmentally restricted setting of the District, intra-site and inter-site analyses of sites, some of which have already been associated with Woodland period occupancy, may involve fewer variables with a higher degree of resolution that can lead towards an understanding of site specific and District wide characteristics. Consequently, the District has the potential of yielding fundamental information on intra- and inter-site patterning and characteristics that will facilitate all future archaeological studies undertaken in the watershed.

Developing A Site Evaluation Program: Spring, 1982

Although a number of general inferences could be drawn about some of the physical characteristics of site areas within the District following the reconnaissance survey, many questions remained unresolved. For example:

--What is the total culturally definable site population in the project area?

--Do the larger sites reflect large communities of people or the overlapping of the types of sites found on the narrower terraces?

--If they do represent large communities, is the apparent focusing of such sites in the broad floodplain areas the result of higher food resource potential, cultural preference for open spaces, or is it the result of a sampling bias due to the specific configuration of the project boundaries?

--How much has flood deposition affected site visibility?

--Has erosion destroyed large portions of the sites located by surface inspection of the riverbanks?

--What is the range and frequency of archaeological data classes--tools, cooking hearths, storage pits, workshop or processing areas, shelters, burials--at each of the identified sites?

--What is the range of human activites carried out, during what season(s), with what frequency through time?

These and other questions related to site condition and the informational content of sites could only be adequately addressed through further site identification efforts and individual site assessments. Answers to many of these questions would be necessary before the scope, purposes and details of.any mitigation plan could be developed.

With these questions in mind, the consulting archaeologists prepared a detailed plan for evaluating the archaeological properties within the Highgate Falls Prehistoric Archaeological District. Completed in April, 1982, this plan outlined the procedures for collecting and analyzing five types of information. The following scope-of-work was proposed. 1) In order to better understand the environmental context, structure and integrity of the site areas, a more complete assessment of the geomorphology of the floodplains and low terraces was to be undertaken. 2) As complete an inventory of culturally meaningful sites as possible was to be obtained. 3) The horizontal and vertical structure of identified sites would be defined. 4) For at least a sample of sites, an appraisal would be made of their data content, age, cultural affiliation and integrity. 5) For each site, the direct and indirect impact of the hydroelectric project would be determined. It was recognized that a number of these issues are interrelated and that tasks designed to gain information about one data class would produce information about others. The evaluation process outlined in the accompanying flow diagram (Figure 3) was proposed.

After extended discussions between the consulting archaeologist, the Vermont Division for Historic Preservation, Lloyd Chapman of IAS-NPS and Ronald Anzalone of the National Advisory Council for Historic Preservation, a modified site evaluation plan was devised. Cost factors were the primary reason for reducing the scope-of-work. Brief statements made below describe the modifications to the original plan and discuss the implications of such changes for interpreting the archaeological resources within the District (refer to Figures 3 and 4).

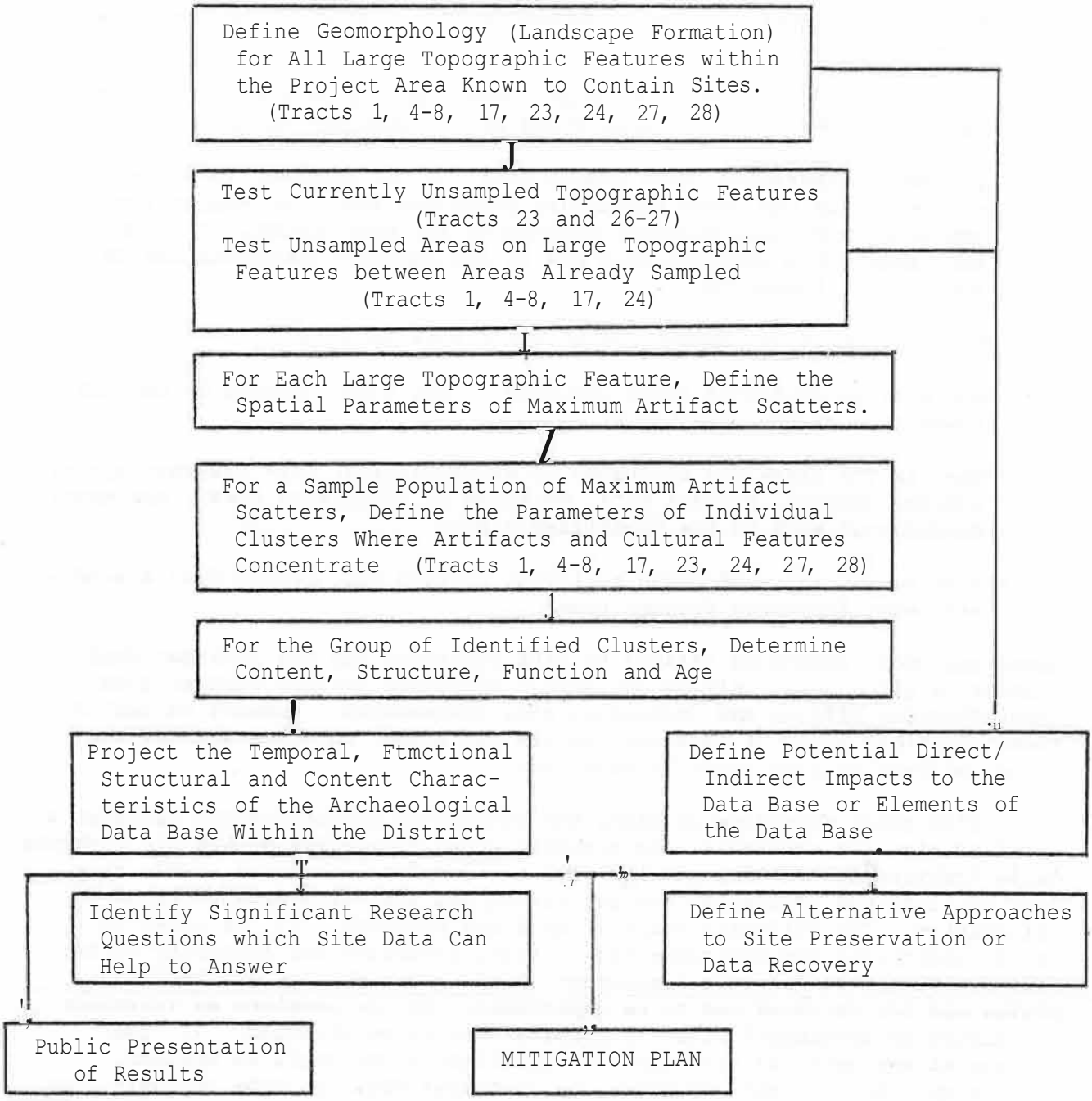


Figure 3

A Phased Program of Site Evaluation

Highgate Falls, Vermont

The most significant change was the elimination of Task 2--the testing of unsampled topographic features (Tracts 23, 26 and 27) and the testing of unsampled areas on large topographic features between areas already sampled (Tracts 1, 4-8, 17 and 24). The initial reconnaissance survey provided a 5.5% sample of the surface area within the project boundaries. After discounting areas of low site probability and those areas actually sampled, the elimination of Task 2 means that 70-90% of the project area will remain untested. Any archaeological sites which exist in such areas will remain unidentified. For this reason, quantitative statements about the density of prehistoric sites along this segment of the Missisquoi River can be made only with a minimal degree of confidence. Statements related to the size range of sites, the diversity of cultural data which are present and the temporal range of sites in the District must remain somewhat equivocal.

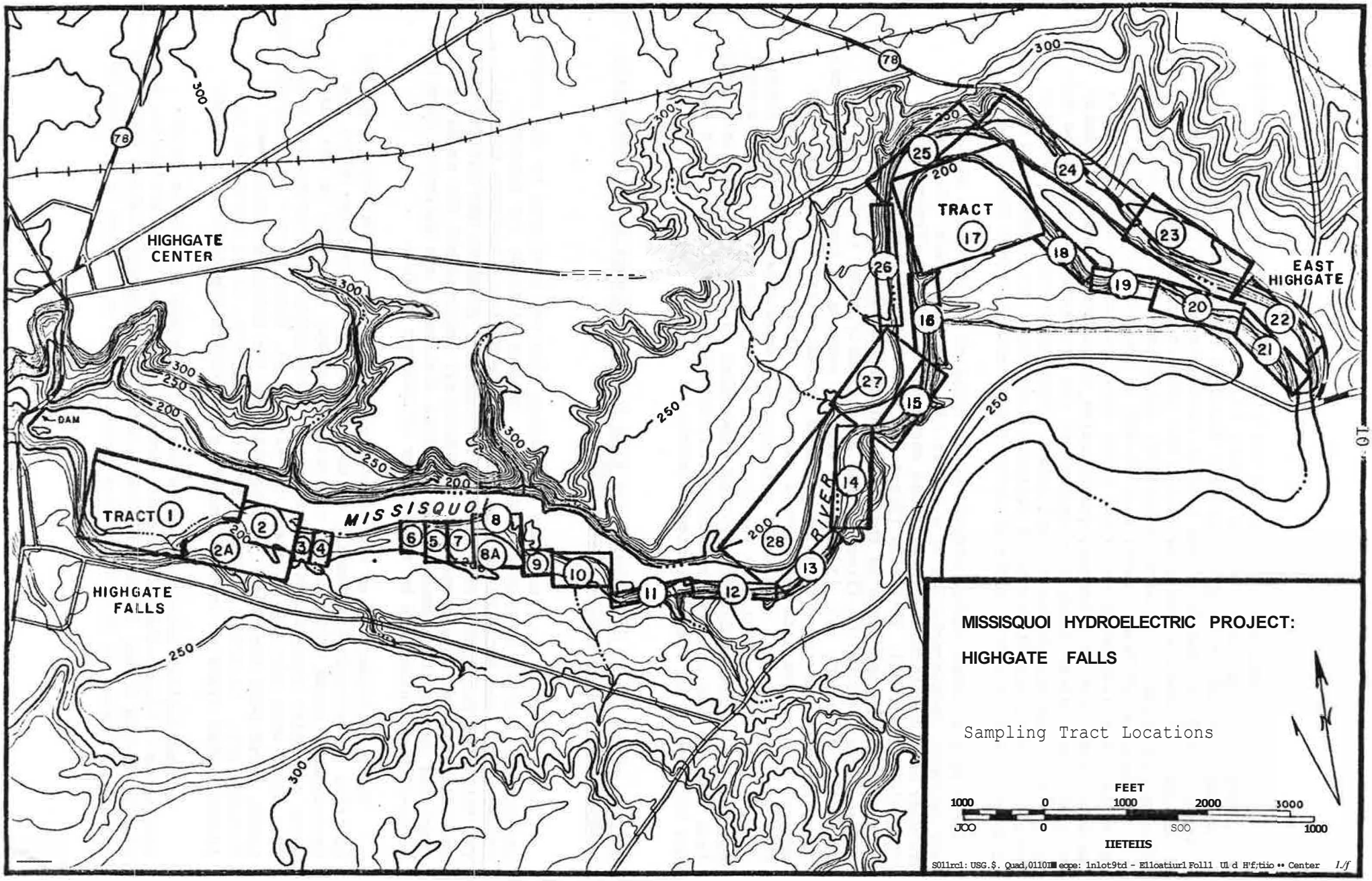
As to the other tasks, efforts would focus on defining the structural and cultural characteristics of a sample-of large site areas which had already been identified. These areas encompass VT-FR-103 (Tract 1), VT-FR-140 (Tract 28), VT-FR-139 (Tract 27) and VT-FR-134/138 (Tract 24) and represent major land forms in the lower, middle and upper portions of the project area. VT-FR-104 (Tract 4) was subsequently added to the sample. VT-FR-105, 106, 130, 131, 132 and 133 were to receive no further evaluation. Thus, although the identification of these latter sites has produced some general comparative data about where sites are likely to be located in the District, cultural data about prehistoric connnunities which these sites contain will not be available for study and interpretation. (To some extent, the results of the evaluation program undertaken in 1982 make this deficiency less serious than originally anticipated, because many of these sites are now believed to be roughly contemporaneous.)

Outline of the Final Site Evaluation Plan for the Highgate Falls Prehistoric Archaeological District: June, 1982.

As noted above, a final site evaluation plan was developed by the project archaeologist after consultation with the Vermont Division for Historic Preservation, the National Park Service and the National Advisory Council. The following paragraphs provide some introductory connnents and outline the specific goals to be addressed, the methodology employed and the tasks to be completed during the summer of 1982. These statements are excerpted from the scope-of-work authorized by the Village of Swanton in June.

The significance of an archaeological property in the National Register District is determined primarily by the information it contains about the environment, human behavior and cultural change and stability in the past--about conunnity composition, about the manufacturing and subsistence activities which were carried out along the Missisquoi, about short- and long-distance trade, about past societies' relationships to the changing environment of Vermont, etc. In order to deal with these subjects, it is essential to identify what types of information the sites within the District contain.

Archaeological resources may be usefully divided into three major categories: items--things which are normally referred to as artifacts, but also including bones, flakes, pollen, seeds, etc; deposits--which generally applies to lenses or fill in various features such as hearths or storage pits;


HIGHGATE CENTER
HIGHGATE FALLS
TRACT 1
TRACT 17
EAST HIGHGATE
MISSISQUOI
RIVER
DAM
78
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MISSISQUOI HYDROELECTRIC PROJECT:
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Figure 4.

and surfaces or discrete vertical soil units--essentially all two-dimensional "living" or "occupation" levels. Furthermore, all of these resources exist in a three-dimensional context of form, time and space. It is the qualitative and quantitative differences among these categories which allow the archaeologist to make and test inferences about past human populations. (See Figure 5 for further detail.)

There are two additionalproperties of variation in archaeological resources. The first is clarity, that is, the degree to which archaeological deposits or "living" surfaces can be isolated from one another. Since one of the primary goals of archaeology has been to understand and define the activities which took place at specific sites, as well as the possible variations through time, it is important that artifacts which were employed in a number of functions at one period be isolated from earlier or later components.

The second property of variation is integrity, that is, how good has the preservation of archaeological resources been? What is the condition of the animal and plant remains? How complete is the stratigraphic sequence?

The field work proposed in the site evaluation plan is designed to evaluate the content, clarity and integrity of sites which are present in Tracts 1, 24 and 28 (see Figure 4). Specifically, the plan has five broad goals.

-- 1) The initial field evaluation done in 1980 suggests that a number of sites contain a vertical sequence of occupation levels. To test the depths to which the archaeological evidence left by past societies is buried, the vertical structure of a sample of these sites will be explored with the use of backhoe trenches which cross-cut identified zones of occupation.

-- 2) Only a limited amount of information exists about the horizontal dimensions of the sites within the District. For this study we will define the outside limits of a site as those points beyond which prehistoric artifacts and deposits are no longer encountered. By extending backhoe trenches across known sites, by screening (at regular intervals) a sample of the soil which is removed and by identifying the location of deposits exposed in the trench walls, we can partially define the boundaries of concentrations of artifacts and features which are assumed to represent distinct episodes of occupation or activity.

-- 3) The range and density of the types of artifacts and deposits present at any site are virtually unknown; 99.998% of all identified sites have not been tested. By screening the dirt from the backhoe trenches, information on artifact content can be gained. However, different types of activities undertaken at a camp or village--those related to living quarters, cooking areas, butchering areas, workshops for tool production, etc.--produce different patterns of artifacts and features. Backhoe trenches are poorly suited for obtaining this type of horizontal information. Therefore, a one day intensive survey of plowed land in Tract 27 will be conducted to determine the size and composition of any identified concentrations of artifacts. Similar concentrations may be inferred for Tract 28 which lies immediately to the east.

CONTENT AND STRUCTURE OF NON-CONTEMPORANEOUS ARTIFACT CLUSTERS INFORMATION CONTENT	By comparing the spatial, temporaf and functional similarities and differences between sites can identify any change or continunity in the types of activities carried out at this location; can begin to test models of social/cultural processes. By focusing on a number of sites situated in one environmental zone can develop an archaeological data base to be used,for comparison with environmentally dissimilar areas of Vermont and the greater Northeast.				
DISTRIBUTION OF CONTEMPORANEOUS ARTIFACT CLUSTERS INFORMATION CONTENT	By defining the relationship between contemporaneous clusters can develop inferences about site structure/size, site function, size of the social unit using the site, langth and/or frequency of occupation. Taken together, can define the range and variation of activities carried out.				
PATTERNED CLUSTERS OF ARTIFACTS INFORMATION CONTENT	Can define specific activities carried out: tool manufacture, processing of raw materials, storage arrangements, shelter, etc. Can interpret indivldual or group behavior: how, when, where and with what frequency certain activities were carried out.				
CULTURAL ARTIFACTS; CULTURAL/NATURAL FEATURES INFORMATION CONTENT	ARTIFACTS	FIRE HEARTHS	OTHER TYPES OF FEATURES	BURIALS	NATURAL FEATURES
	Definition of manufacturing techniques Function: derived from form and wear analysis Style: establish site age; inferences about cultural preferences and regional interaction Raw materials used: inferences about distance of transport,. trade or direct acquisition	From charcoal samples: C-14 dating; identify local plant community From bone, seed nuts: human diet, season occupation, duration of use	Post molds:type of structures Storage pits: human diet, subsistence strategies; !Refuse pits: human diet, length of occupation, season of occupation ock terraces: methods of food preparation	Physical features Diseases Life expectancy Burial practices Trade (if burial good are present)	Soil profiles: Topographic/landscape changes or stability; periodicity of flooding with possible climatic implications; effect of flooding on land use and on site distribution/ visibility

Figure 5. Potential Data Classes and Their Interpretive Value.

-- 4) Subsequently, a 20 x 20 m horizontal grid of 50 x 50 cm test pits spaced at 2.5 m intervals will be used to obtain an initial impression of the horizontal patterns of artifacts and/or deposits within two areas chosen from Tracts 1, 24 or 28 in addition to the bac hoe trenching.

-- 5) Following field study and the laboratory processing of artifacts, soil samples, etc. the information obtained must be evaluated and synthesized. This will lead to the preparation of a summary report for submittal to all agencies involved in the review process. Once reviewed this report will provide the foundation for any mitigation plan which is developed for the Highgate Falls Hydroelectric project.

The Site Evaluation Program: Summer-Fall, 198.Z

Although some modifications to the original scope-of-work were required to make the best use of the time available and to expand the information base, the primary goals of the site evaluation plan have been met. A brief summary for the field and lab work follows.

Fieldwork began during the week of June 25, 1982, and continued during the subsequent eight weeks. A few rainy days were spent processing artifacts in the lab. Efforts focused on VT-FR-103, 134 and 140. A one-day intensive walkover survey of Tract 27 (VT-FR-139) was completed. Additional testing was undertaken at VT-FR-104. Three new sites (VT-FR-151, 152 and 153) were identified along the narrow riverine terrace in the vicinity of VT-FR-104, primarily as the result of bank erosion exposing cultural artifacts. Sub-surface sampling involved the use of eleven 2-meter-wide backhoe trenches with a total length of 247 meters; four 2 x 4 meter units; twenty-three 2 x 2 meter units; one lxl m unit; and one hundred sixty-two 50 x 50 cm units.

Following the fieldwork, artifacts were washed and cataloged. Although it was anticipated that between 5,000 and 10,000 artifacts would be recovered, the final count exceeded 18,000. Computer entry of both field and lab data has been completed and the files merged into a final catalog. Several descriptive computer programs have been run which sort the collection into basic categories. Distributional patterns of artifacts from VT-FR-103, 134 and 140 have been plotted to define activity areas and to check for clarity. A descriptive faunal analysis has been finished, based on the bone recovered at VT-FR-104, 140 and 134. The analysis of approximately 200 soil samples for phosphate content (related to organic refuse) and the mechanical analysis of soils from representative trench wall profiles have also been done. Graphics are in the final stages of production. This information will be presented in a sununary report which is currently being prepared.

Intensive site evaluations carried out at VT-FR-103, 104, 134 and 140, in-conjunction witbthe data obtained in 1980 during the preliminary evaluation, allow us to make a number of conclusions concerning the physical and temporal characteristics of prehistoric sites which lie within the project area. Several conclusions are briefly stated here.

-- 1) A series of C-14 dates obtained from logs associated with old river channel deposits which underlie VT-FR-140 indicate that at least one, and perhaps all, of the floodplains and low terraces immediately adjacent to the river were formed between approximately 7,000 and 5,000 years ago.

This was apparently a period of major flooding. The local plant community included white cedar, hemlock, maple and beech. After this period of floodplain formation, the river apparently became entrenched in its current channel.

-- 2) This information suggests that there is no environmental reason why prehistoric sites dating after 5000 B.C., and particularly after 3000 B.C., could not be found within the floodplains and low terraces. Nevertheless, current evidence points to an intensive use of these low physiographic areas only after about A.D. 700 (i.e. during the Middle and Late Woodland periods). Woodland period archaeological deposits were identified along the river at VT-FR-103, 104, 134, 139 and 140. A C-14 date of 1180 ± 90 B.P. was obtained from a cooking hearth at VT-FR-140. Evidence of earlier occupations was not encountered in the thick alluvial deposits exposed in the walls of the trenches excavated at these sites.

-- 3) At least two clusters of archaeological material dating to a probable pre-Woodland period were identified. These are located on slightly higher terraces which border the floodplain and low terrace at VT-FR-104 and 140. No tmequivocal diagnostic artifacts were recovered which could pinpoint the age of these sites, but a temporal range of 8,000-4,000 years ago is anticipated. If this hypothesis is correct, then there appears to be a le association between lowlying physiographic areas and Woodland period occupations and higher alluvial terraces and Archaic period sites.

-- 4) Although the sites located in the floodplains or on the lower terraces appear to be roughly contemporaneous, dating from approximately A.D. 700-1300, they exhibit considerable variability in size, as well as artifact/feature density and content. The initial fatmal analysis suggests that sites were also utilized during several seasons. In brief, sites are highly tmlikely to be functionally equivalent.

-- 5) All archaeological deposits were found in the top 40-70 cm (15-30") of the soil. Due to these fairly shallow depths, plowing has partially disturbed the integrity of cultural deposits in some areas. With the exception of VT-FR-103, however, even at sites where plowing has occurred, considerable clarity and integrity of deposits still exist. This is true for at least VT-FR-140, 134 and 104.

Current Status: December, 1982

A summary report of the intensive site evaluation program conducted during the sutmner and fall of 1982 is in the final stages of production. It is anticipated that this report will be ready for distribution and review by mid-February. Following agency review a mitigation plan will be prepared.

Preliminary discussions were undertaken between the project archaeologist and personnel at the Vermont Division for Historic Preservation on December 9, 1982. A summary report was presented by the consulting archaeologist concerning the work completed to date. This was followed by several hours discussion

which focused on the refinement of research goals and the identification of those sites, or portions of sites within the National Register District, which are believed to contain the most significant archaeological information.

Because all identified sites in the Highgate Falls Hydroelectric Project area are shallow, preparation of the impoundment for hydroelectric generation, subsequent site inundation and erosion are expected to have a significant adverse effect on all archaeological properties within the District. The in-place preservation of sites by modifying the scope of the hydroelectric project seems to be an unlikely possibility. For this reason, any mitigation plan must rely on site excavation to recover at least some of the more important types of cultural information. A preliminary review of all data collected to date leads to the conclusion that at least three areas within VT-FR-104, two areas within VT-FR-134 and four areas within VT-FR-140 contain environmental and cultural information which could make a significant contribution to our understanding of both Vermont's and the region's prehistory. Data recovery is likely to be concentrated at these sites.

THE 1982 SITE EVALUATION PROGRAM

Introduction

The report which follows covers in detail the site evaluation program undertaken during the summer and fall of 1982, as well as the conclusions derived from this study. The text is divided into four major sections. The first two are general and synthesize information on project-wide issues, specifically 1) the probable temporal development of alluvial terraces and flood plains within the project area and 2) the sampling approaches which were employed. In the third section, individual sites -- VT-FR-103, 104, 134-138, 139, 140, 151, 152 and 153-- are discussed. Data are presented in summary form. Because the site evaluation program focused on defining the physical characteristics (horizontal and vertical limits) of selected sites within the archaeological district, as well as the temporal affiliations and integrity of the archaeological data classes which are present, site descriptions are divided into a number of subsections which address these topics. If initial analytical studies have been completed, general inferences, along with preliminary conclusions and recommendations for further study, are summarized in a final section.

Land Forms, Archaeological Sampling and Site Locations

The Reconnaissance Survey of 1980: Stratifying the Landscape for Sampling

The Highgate Falls hydroelectric project area is difficult to divide into contrasting environmental zones, as little faunal or floral variation is exhibited. The boundaries of the project area essentially confine the archaeological survey to one environment, a riverine one. However, some physiographic variation within this one zone does exist, particularly in the river valley's topographic characteristics between East Highgate and the dam in Highgate Falls (see Figure 1). This physiographic variability was used to stratify the project area into a number of sampling units during the reconnaissance survey conducted in 1980.

Using the 200-foot (61-meter) contour line as the basis for establishing the maximum extent of the proposed power pool, it is immediately apparent that the width of the land surface adjacent to the river to be affected by inundation may encompass several different topographic features, which in part determine the localized configuration of the flood pool boundary.

In the downstream, 1.7-mile long section, the river valley is narrow. Moderate-to-steep slopes are common, particularly on the north bank. Inundation will be primarily limited to the more elongated flood plain strips present below the second and third order terraces which form the valley escarpments. One major exception to this general pattern is the large flood plain located along the southern bank of the river in the western section of the project area. Upstream, for slightly more than 2 miles, between a 10-foot fall line in the river and East Highgate, the river valley is characterized by a number of narrow to moderately broad flood plains where encroachment by the flood pool may approach lateral distances of up to 500 feet. These topographic features are present on both sides of the river, and are interspersed between valley sections which contain the steep side slopes of the higher glacial delta terraces which border the impact area.

The first episode of fieldwork in 1980 focused upon the lower section of the river valley near Highgate Falls. Two major topographic elements were identified--a broad, low flood plain currently in use as a pasture, and a series of relatively narrow, wooded terraces which extend upriver to the fall line in the river. The large flood plain was designated Tract 1, while Tracts 2-9 are located at various points along the series of narrow terraces (see Figure 4).

In Tract 1, five discrete testing areas were located on topographic rises adjacent to the present channel. Wet and swampy areas adjacent to the renmant channel which forms the western and southern boundaries of the tract were avoided, as were other obvious depressional areas resulting from flood channeling or erosion. In Tracts 2-9, areas with steep slopes were not tested, and the poorly drained areas which resulted from seepage springs below the second order terraces to the south were avoided. In addition, some preference was given to those portions of the tracts nearest the small tributary streams which were frequently encountered in this portion of the project area.

Fieldwork involved the excavation of 13 transects and clusters containing a total of 92 test pits in 9 sample locations or tr cts. On the basis of this sample, five areas of prehistoric activity were identified. Four of these areas--VT-FR-104, 105, 106 and 130--had fairly discrete boundaries. In Tract 1, a low density of artifacts was found to be present in all sampling locations extending over a distance of 1900 feet parallel to the river.

A second phase of fieldwork was undertaken in 1980. Priority was given to the land areas upstream from the fall line in the river, beginning at the point where the first episode of sampling had left off. The upstream section of the project area was subdivided into 19 additional sample areas, or tracts (see Figure 4). Subsequent on-site assessments by field personnel eliminated 10 of these tracts from further consideration on the basis of steep slopes or modern disturbances. Because of the multiplicity of localized formative features in the larger flood plain areas, testing locations within each of these tracts were variable. Levees, low erosional terraces near the active river margin, as well as near fossil river channels, secondary terraces along the perimeter, and the broader terraces of the flood plains themselves, were included in the sample obtained. Areas of steep slope, depressional channels, and obvious flood swales were avoided, as were the swampy areas which were sometimes encountered at the base of the steep slopes which form the backs of the flood plain surfaces. Regardless of the microrelief features, however, in all tracts except Tract 17, sampling was carried out close to the present river channel.

Four of the sample areas, Tracts 17, 24, 27 and 28, consist of broad or elongated flood plain surfaces which are comparable to Tract 1 in the downstream section of the project area. Of the remaining five sample areas, Tracts 10 and 14 consist of more confined, narrow terraces below the higher valley slopes in the middle portion of the project area. Tracts 19 and 20 are little more than remnant fringes of low flood plain terraces near the active flood plain margin along the upstream end of the impoundment pool. Tract 23 designated a large flood plain along the north bank of the river just west of East Highgate.

One final sampling objective was partially met at the end of the second field session. Due to the redesign of the flood pool from the 185-foot to the 200-foot contour line, several of the higher, second and third order terraces (elevation: 186-190 feet and 198-202 feet, respectively) in the downstream section of the project area would become unstabilized as the result of encroachment by the raised water level. Since the earlier field session had documented the presence of prehistoric sites on the lower terraces (elevation: 178-182 feet), the final goal of the second field session was to document any relationship between these activity areas and the higher terraces upslope from them. Two additonal tracts (2A and SA) were sampled within this goal in mind.

Three hundred and forty-four test pits arranged in forty-six clusters or transects were excavated during this second phase of the survey. In addition, the subsurface sampling in each of the flood plains was augmented to different degrees by surface walkovers of exposed areas. On the basis of this sample, ten prehistoric sites were defined in the upper portion of the project area. Several of these appear to be discrete areas of occupation, while others, like VT-FR-139 and 140, encompass 5-10 acres and exhibit

evidence of multiple occupations. Although the sample was limited, no evidence of prehistoric occupation was found on the second and third order terraces.

Several thing,were characteristic of our thinking during this initial phase of work. First, because the only topographic maps available were in 10-foot contour intervals, more subtle relief in the 2-6 foot range was not considered when developing the sampling design. Second, the location of the present river channel was treated as a constant and nearly all sampling was conducted within 200 feet or less of the riverbank. For these reasons, the possibility that sharp breaks in the surface relief, ifi only of a 4-6 foot magnitude, represented terrace edges of earlier river channels was not considered until field testing was nearly completed and 2-foot contour interval maps had been prepared. As these topographic breaks occur hack from the current channel, sampling was limited in such areas.

A number of questions arose as the result of field observations and archaeological testing. How stable had the flood plains and terraces been? If they had been fairly stable, for how long? Were there periods when major alluviation or downcutting caused the river channel to shift? If so, when? Had flooding buried archaeological sites or eroded them away? Were subtle changes in surface relief of any significance, i.e. did they relate to different periods of flood plain development? If so, was there a relationship between minor topographic features and archaeological sites dating from different time periods? If this possibility existed, how representative was the sample of sites identified during the initial field season?

The 1982 Field Program: Evaluating the Changing Landscape

During the intensive site evaluation program conducted in the summer of 1982, answers to a number of these questions were sought. To do this, a heavy reliance was placed on evaluating the geomorphology of the broad flood plains and riverine terraces in the upper, middle and lower segments of the project area--Tracts 24, 28 and 1, respectively (see Figure 2 and 4). These areas also contained prehistoric sites--VT-FR-134, 135, 136, 137; Vt-FR-140; VT-FR-103, respectively. Based on soil survey maps (USDA 1979), all low flood plains and terraces were formed from alluvial deposits. For this reason, it was assumed that close similarities in the geomorphological characteristics of different land forms might indicate that they were formed under similar conditions and perhaps during the same periods. Several sets of aerial photographs taken during the last twenty years were used to identify a series of meander scrolls on Tract 17, as well as a series of levee and swale formations on Tract 1. These help to define the changing configuration of the river channel. With the addition of four C-14 dates derived from logs which were recovered immediately above old channel gravels in Tract 28, a partial chronology of changing land forms has been developed. In turn, the point at which different surface areas became available for prehistoric occupation can be approximated.

Little information is available which relates to the earliest physiographic changes in this segment of the valley. However, several developmental episodes can be reconstructed from surficial geology maps of the

area. Once the glacial ice mass,which once covered all of New Englan had retreated north of the Missisquoi River basin, a glacial lake was formed and thick deposits of lacustrine clay, silt and sand were deposited in the bottom. Subsequently, the Champlain Lowland was inundated by marine waters --the Champlain Sea--extending down the St. Lawrence Lowland. This marine epi's..ci.deasted from approximately 12,800 to 10,200 years ago (years B. P.) , although various drops in the level of the Champlain Sea are apparent (Thomas et al. 1981:48-51). Thus, marine clays, as well as thick deposits of outwash sand and gravel which formed a delta into the sea, cover the older lacustrine clays. These outwash deposits are particularly evident north of the river (see Figure 1) where surface relief is generally very gentle (300-320 feet m.s.1.). Here, sands and gravels are over 50 feet thick.

With a drop in the level of the Champlain Sea as the land rebounded after glacial recession, earlier marine features were isolated high above the valley as we know it today. For example, an early beach which once bordered the Champlain Sea now lies at an elevation of 450 feet m.s.l. just north of East Highgate. The Reagen Site--a Paleoindian camp which dates from 9-10,000 years ago--is located on this feature. More significantly for our present discussions, the Missisquoi River began a period of rapid downcutting. If we assume that the Champlain Sea had dropped below the present-day 300-foot contour and lay west of Highgate Falls by 10,600 years ago (Fillon 1970:30) and if we assume that the C-14 date of 8,090 ± 110 B.P. is correct for the oldest log recovered in Tract 28, then it is apparent that the river cut a wide swath through the outwash deposits some 4,000 feet wide and 100 feet deep between 10,600 and 8,500 years a.go. In some respects, by roughly 8,000 years ago the configuration of the river channel was similar to that of today, although the broad alluvial flood plains and low terraces innnediately adjacent to today's channel had not yet developed (see Figure 9).

The best evidence for post-8500 B.P. land form changes comes from a number of backhoe trenches which were excavated across portions of Tracts 1, 28 and 24. In each tract, the same general sequence of alluvial and channel deposits were encountered. At the base of the sequence, stratified channel gravels were identified which dip to the south (Tracts 28 and 1) or west (Tract 24), thus indicat:ing both the magnitude and direction of downcutting and channel movement. Overlying the gravel deposits is a thick sequence of stratified alluvial sands which are interpreted as overbank deposits laid down adjacent to the channel during periods of high water. The e sediments also dip to the south (Tracts 28 and 1) or west (Tract 24). However, not one, but at least two alluvial episodes left distinct sedimentary sequences next to the river channel.and within specific topographic features.

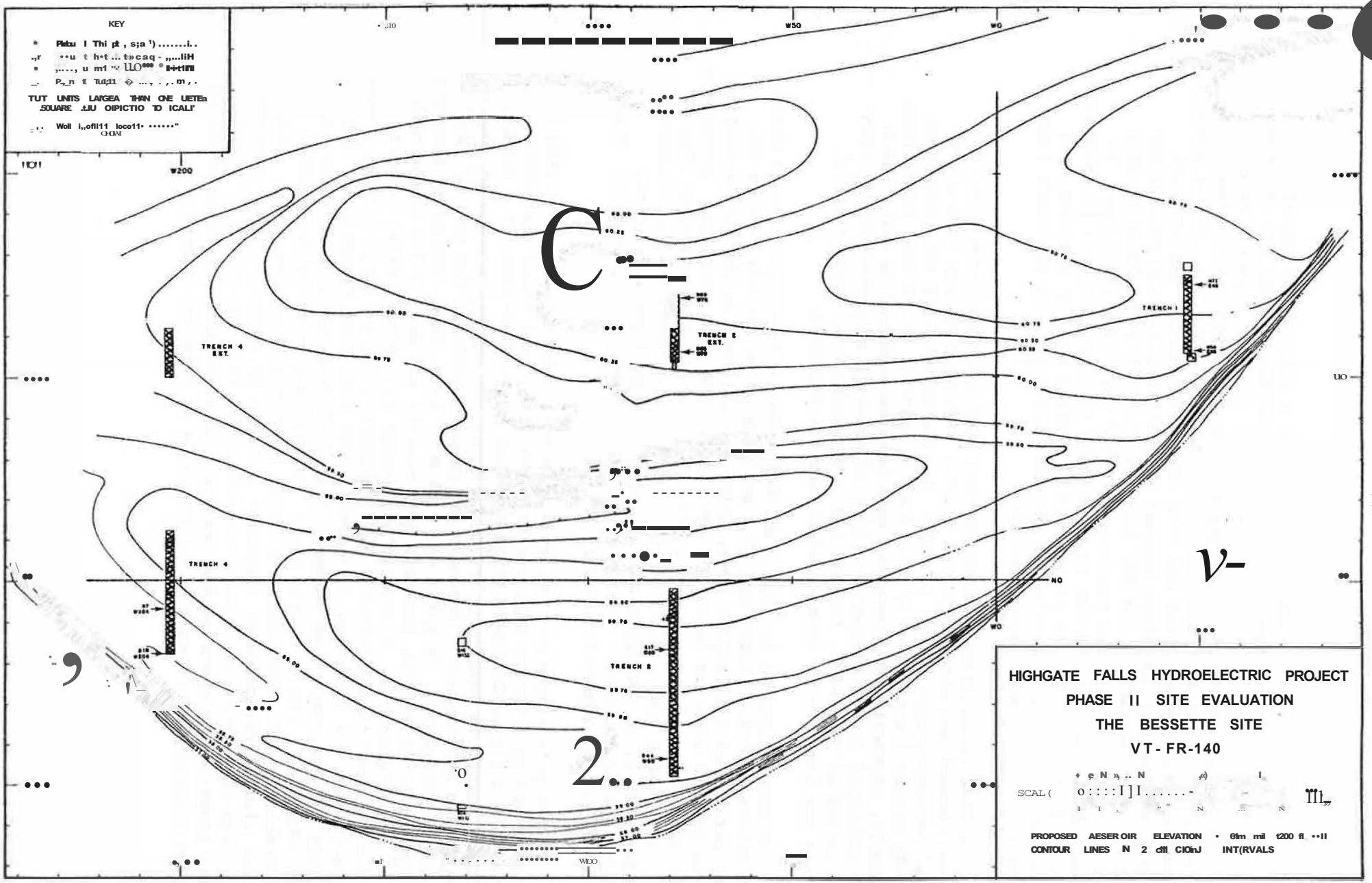
The earlier sequence of alluvial deposits is characterized by thin (1-2 cm) interbedded sequences of silts and very fine sands. They are very compact, light yellowish brown to dark brown (10 YR 6/4-10 YR 4/4) in color and are moderately to poorly drained. Given the regularity in the thinness of individual beds and the lack of any significantly coarser or thicker alluvial layers in the sequence, it is suggested that deposition occurred during a period of relative dryness in which climatic conditions were fairly stable. Major floods appear to have been uncommon because erosional disconformities were recorded in only one instance and thick depositional beds are not evident. On Tract 28 this sequence was encountered in Trench 1, Trench 2-Extension and Trench 4-Extension where surface contours range between 196

and 200 feet m.s.l. (59.75-60.75 m). Part of a hemlock log was recovered from the base of the sequence in Trench 4-Extension (elevation: 185.3 feet m.s.l.; 56.50 m m.s.1.) and dated to 8,090 ± 110 B.P. (years before present). Given the higher elevation of the gravel beds in Trench 2-Exte sion (190.2 feet m.s.l.; 58 m m.s.l.) and Trench 1 (191.8 feet m.s.l.; 58.5 m m.s.l.) and taking into consideration the time needed to deposit the overbank sequence adjacent to the river channel at that period, most present-day surface areas between 196 and 200 feet (59.75-60.75 m) in Tract 28 were probably established in the era between 8,500 and 7,500 years ago. By extrapolation, terraces on the southern edge of Tract 17 which lie between 200 and 204 feet m.s.l. are probably of a similar age, as are some very narrow terraces at an elevation of 184-186 feet m.s.l. on the south bank of the river downstream from Tract 28.

In most cases these contemporaneous land forms lie back from the current channel and were subjected to only minimal sampling during the intial reconnaissance survey in 1980. Follow-up sampling was undertaken in 1982 within Tract 28 and within Tract 4 (part of Vt-FR-104) downstream. Currently, archaeological deposits have been encountered in soils which have developed from the upper portions of overbank sequences dating from this period at VT-FR-104, 106 and 140. No evidence of archaeological remains was found to be stratified within the sequence.

In conclusion, it is highly unlikely that archaeological sites which date before 7500-8500 years ago will be found below 202-204 feet in the upper portion of the project area, below 196-200 feet in the middle portion of the project area, or below 184-186 feet in the lower portion. Conversely, human occupation of these areas could have occurred any time after 7500 years ago. No evidence of this early depositional sequence was encountered within Tract 24 on the upper end or Tract 1 on the lower end of the archaeological district. Tract 24 lies below the 195-foot contour; Tract 1 lies below the 180-foot contour.

Although the complete sequence of events cannot be grounded with C-14 dates, existing evidence suggests that the Missisquoi River went through a period of fairly rapid downcutting sometime after 7500-8000 B.P. Evidence for this occurs in Trench 1, Tract 28, where the channel gravels at the base of the stratigraphic sequence dip gently southward for most of the length of the trench, dropping only .25 m in 11 m, then, beyond an erosional disconformity in N60E48, they dip very steeply and drop 1.5 m in the next 18 m. (see Figure 7). A topographic change in surface relief between Trench 2-Extension and Trench 2 also suggests a fairly rapid drop in channel elevation and the formation of a steep river bank (see Figure 6). This episode was followed by an extended period of less rapid downcutting (ca. 7000-5000 B.P.), but by fairly rapid lateral migration of the channel accompanied by the development of broad flood plains on the convex side of the river. The temporal framework is based on three C-14dates derived from logs recovered from Trench 2 within Tract 28; the nature of. flood plain formation is based on the textural and stratigraphic characteristics of the alluvial layers exposed in the walls of Trenches 2 and 4.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TRENCH 4 EXT.
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HIGHGATE FALLS HYDROELECTRIC PROJECT
PHASE II SITE EVALUATION
THE BESSETTE SITE
VT - FR-140
PROPOSED AESER OIR ELEVATION • 6tm mil t200 fl ••II
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Figure 6.

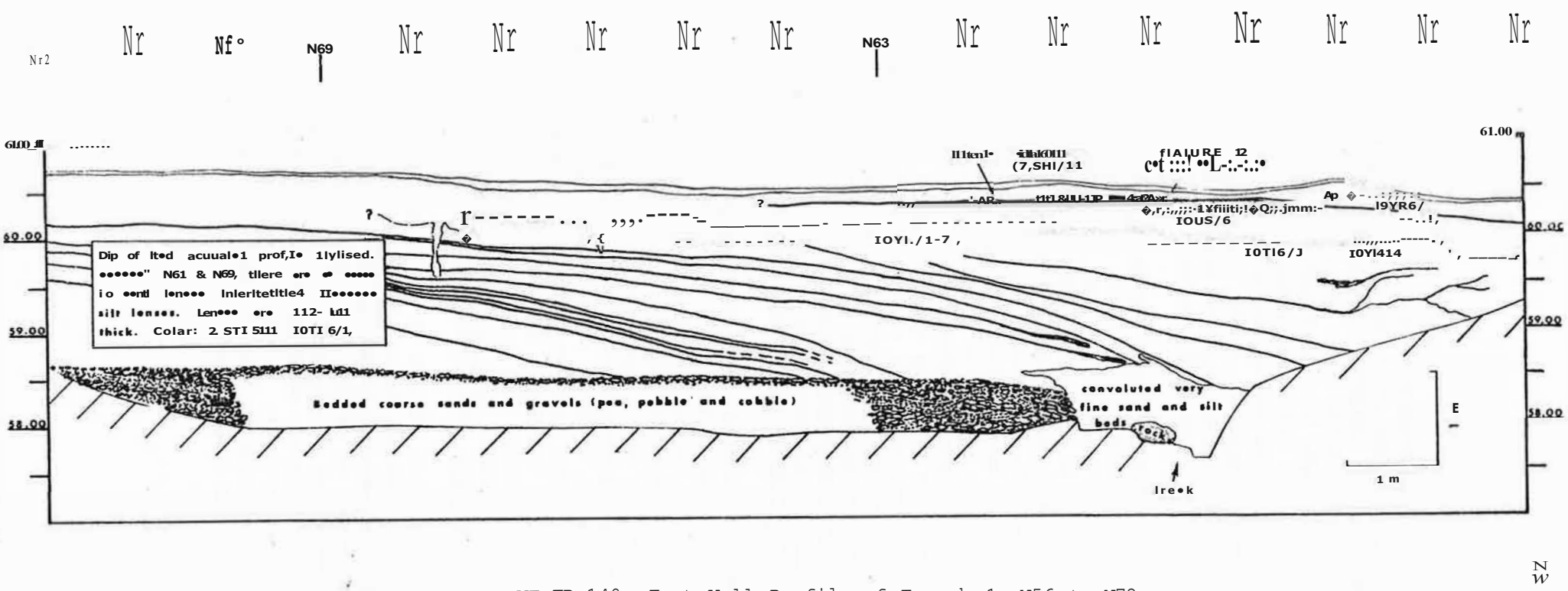


Figure 7. VT-FR-140: East Wall Profile of Trench 1, N56 to N72.

As is evident from the 3.5 m (11.5 ft) vertical profile recorded in Trench 2 (see Figure 8), the vertical sequence consists of poorly sorted cobble, pebble and pea gravels at the base which dip towards the present river channel. These are overlain by a sequence of very thin, interbedded, grey to dark grey, very fine sands and silts which contain heavy minerals and micas in the deepest beds. This unit is approximately a meter thick, but tends to become thicker towards the current channel. These thin beds were deposited in shallow and fairly slow moving waters on the lee edge of the channel. A number of logs were snagged along the river bank and became embedded in these sediments. As the channel migrated southward, these thin beds, as well as the logs, were covered with overbank deposits of sand.

Unlike the lower depositional sequence just discussed, the upper stratigraphic sequence of overbank sediments is complex and texturally variable. It is frequently characterized by thick packets of very fine to medium sands which grade upward from coarser to finer in individual beds, as well as from coarser to finer with increasing distance from the channel. Depositional contacts are often visible. Due to textural similarities a number of thin beds which may have existed could not be differentiated from one another unless divided by coarser deposits. On the other hand, some individual beds range in thickness from 5-25 cm. Sediments in this general sequence are typically unconsolidated, well drained (no mottling occurs), and very pale brown to light yellowish brown (10YR?/4-6/4) in color. Given the characteristics of these sedimentary beds, it is reasonable to hypothesize that this flood plain was formed during a climatic period when very moist conditions prevailed or when cool conditions allowed substantial snow build-up in the mountains which subseque tly caused intense flooding during the spring.

About mid-way in the vertical profile, these is a roughly meter-thick zone where the alluvial sand bodies are surrounded by anastomosing darker and siltier very fine sands which run laterally for some distance, then make an abrupt angle change or disappear entirely (see Figure 8). This is a developmental argillic horizon in which layer-lattice silicate clays have accumulated by illuviation (the downward leaching of fine particles). In sands the argillic horizon commonly forms as a series of lamellae, sometimes called fibers. The genesis of the lamellae is not fully understood, and, for this study, is of peripheral interest. What is important are the environmental implications of encountering this type of illuvial horizon where lamellae are prominent. As noted in Soil Taxonomy, A Basic System for Making and Interpreting Soil Surveys (SCS, USDA 1975:19-20, 25):

> Because the formation of an argillic horizon is relatively slow [ordinarily requiring several thousand years], its presence indicates that the surface has been relatively stable and that the period of stability has been long enough to develop an apparent equilibrium between formation and decomposition of organic matter. The presence of an argillic horizon indicated that a substantial amount of water has moved through overlying horizons •..• In humid, temperate, forested regions, the argillic horizon ... helps in distinguishing the stable and the unstable surfaces and also in identifying the soils that have a seasonal moisture deficit.

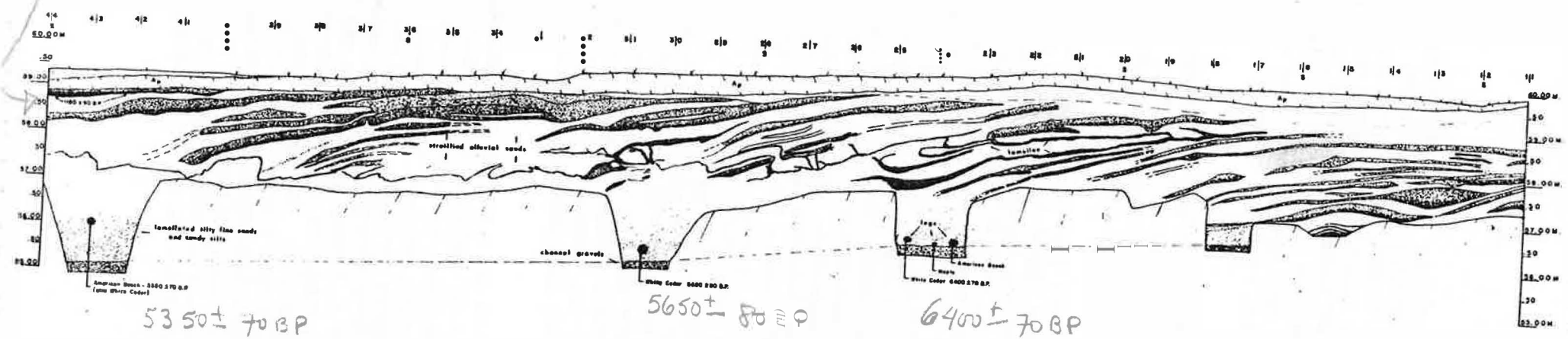


Figure 8. [illegible] West [illegible] Trench 2, [illegible].

Thus, within the Highgate Falls project area, soil bodies where lamellae occur are likely to be at least several thousand years old, are relatively stable, and contain depositional bodies of fairly coarse texture which causes rapid percolation of rain water. Soil bodies with these overlapping characteristics encountered in different portions of the project area may be roughly contemporaneous in origin. Reference to this argillic horizon encountered in Tract 28 will be made subsequently, because this developmental pattern was visible in soil profiles recorded in portions of both Tracts 1 and 24.

Sand bodies of variable thickness and coarseness occur in the upper meter of the profile in Trench 2. Contact boundaries become obscure in the upper 30-40 cm where soil developmental processes have been active and where nineteenth-century plowing is evident.

C-14-dates **were** obtained from logs recovered from the base of Trench 2 at S25, S30/31 and S43/44 (see Figure 8). (These designations indicate the distance in meters south of the baseline of the mapping grid.) Proceeding towards. the river, the dates are 6400 ± 70 B.P., 5650 ± 80 B.P., and 5350 ± 70 B.P., respectively. Given the distance between the southern edge of the older and higher riverine terrace to the north discussed previously and S25 on the lower terrace--about 50 m--in conjunction with the date of 8090 ± 110 B.P. from a log recovered in deposits underlying the older terrace in Trench 4-Extension, it seem likely that the lower flood plain began to develop fairly rapidly between roughly 7000 and 6400 B.P. An average rate of 1 m per 12 years is suggested. However, flood plain growth and channel migration may not have occurred at an even rate, but may have been episodic. It took roughly 850 years, for example, for the channel edge to shift from S25 to S30/31, while it took only 300 years for the channel to move 2.6 times this distance from S30/31 to S43/44. Thus, the rate of lateral channel migration may have varied from as low as 1 m/170 years to as high as 1 m/12 years. If the rate of flood plain development was sustained at roughly that which occurred between 5650 and 5350 B.P. (1 m/23 years), the Missisquoi channel should have shifted to its present location and the configuration of the flood plain should have been developed by roughly 4800-5000 B.P. Based on the log samples, the plant community along the river in the 5000-7000 B.P, interval contained t least cedar, beech, maple and hemlock.

There is little evidence at Tract 28 which suggests that after 4800-5000 B.P. the river did much of anything but entrench itself in its present-day channel. Most of the sedimentary beds which make up the bulk of the flood plain are almost certainly derived from events prior to 5000 B.P. However, two factors do suggest at least a second period of heavy flooding. First, at the base of the older riverine terrace, which is underlain by the sequence recorded in Trench 1, Trench 2-Extension and Trench 4-Extension, there is a depression which runs in a slight east-west arc across the back of the lower alluvial flood plain. This depression lies between the northern end of Trench 2 and a topographic rise of 1.25 m (see Figure 6). Where they are not obscured by soil developmental processes in the upper portion of the sequence, sedimentary beds exposed in the wall of Trench 2 continue to rise slightly as they extend northward below this depression. If this depression had existed during the period of flood plain formation, sedimentary

beds near the depression should dip towards the base of the depression as infilling occurred. Because they do not, this depression is interpreted as a fairly shallow erosional scour which cut into the earlier alluvial beds. This erosional scour probably formed here, rather than farther north, because the flood currents met with considerable resistance when they came into contact with the more compact sedimentary beds of the higher terrace. (Similar erosional features are noted in similar positions in Tracts 27, 24 and 17.) Second, several distinct beds within 30-40 m of the present channel and in the top 60 cm of the alluvial sequence underlying the lower flood plain were deposited relatively recently. A thin (5 cm) alluvial layer of very fine sand extends from Trench 2 westward for at least 100 m at a depth of 40-60 cm below the surface (see Figure 6). A charcoal sample derived from a prehistoric hearth associated with this bed was dated at 1180± 90 B.P. It is suggested that deposition of this ½ed occurred slightly earlier than the human occupation of the site. Other alluvial deposits lie above this bed, thus indicating that one or more periods of major flooding have occurred within the last thousand years.

What the data also suggest is that prehistoric occupation of the lower flood plain within Tract 28 could have occurred by perhaps 6000 B.P., and certainly by 5000 B.P. Based on the datable stratigraphic sequence in Trench 2 (a sequence which is mirrored in Trench 4, but undated), e of such occupatio11s should occur in the top meter or less of the sequence. However, if the interpretation is correct that the e was a post-5000 B.P. period of heavy flood scouring, such processes may have also destroyed earlier archaeological sites which lay within the interior portion of this and similar flood plains. Thus, we might expect that archaeological deposits in these areas will date almost exclusively to a post-erosional era. Because all cultural material associated with these flood plains dates to the past 1200 years, this may well be the case. No evidence was found in either Trench 2 or 4 of deeply buried occupation levels.

Admittedly the evidence may be circumstantial, but the episodes of flood plain formation and probable channel entrenchment which are recorded in Tract 28 exhibit close temporal parallels to similar episodes which occurred in the large watersheds of the Midwest. Here, Dean Thompson and E. Arthur Bettis (1982) found that major upland erosion and heavy alluviation in large river valleys occurred between roughly 8000/7500 and 5000 B.P. This was followed by channel entrenchment, colluviation and slow alluviation between 5000 and ca. 3500 B.P. and by several periods of entrenchment or alluviation in more recent times. These periods also correspond remarkably well with regional pollen sequences in which distinct vegetational zones are recognized and from which general climatological conditions have been inferred (Thomas et al, 1981:34-41). The B-zone dates from roughly 9200-7800 B.P., with beginning and end dates varying somewhat depending upon the specific profile. This period seems to have been warm and dry. The subsequent C1-zone date between roughly 8000 and 5000 B.P. and is viewed as a generally warm and moist period--conditions which could have contributed to upland erosion, increased flood levels and dynamic changes in the lowlying flood plains. The C2-zone dates from approximately 5000 to 2500 B.P. and is felt to reflect a period of warm and dry conditions. If precipitation was sufficiently reduced to cause a lowering of the water table, if only for a few centuries, the river channel may have dropped as well. Once entrenched, any further lateral movement of the channel may have

been very difficult. The C3-zone, dating from roughly 2500 B.P. to the present, began with a cool snap, followed by a series of cooler and warmer phases with variable precipitation rates (Rippeteau 1977: 304; Voigt and O'Brien 1982:25). (Northeastern botanists, zoologists, geologists and archaeologists who are interested in the changing nature of the natural environment (the evolution of ecosystems) could make a considerable contribution by evaluating these data from an interdisciplinary perspective or by expanding the complementary data base needed to refine or redefine these evolutionary trends specifically for New England.)

Based on the reconstructed sequence of major fluvial events developed from Tract 28, an attempt has been made to extrapolate to other segments of the project area. Approximate channel locations have been projected for different temporal periods--8000 B.P., 6500 B.P., 5000 B.P. and post-4000 to pre-1200 B.P. (see Figure 9). Similarities in the textural and developmental structure of the depositional sequences recorded from backhoe trenches in Tracts 24 and 1, the dip angle of the beds, surficial clues of channel movement such as the levee and swale sequence evident in Tract 1 and the meander scrolls in Tract 17 which are visible on aerial photographs, USDA soil maps, and limited temporal indicators provided by archaeological deposits in near-surface portions of the flood plain sequences provide substantial information. Given the preliminary nature of the analyses completed to date, however, it may be better to treat the interpretation as a reasonable working hypothesis rather than fact.

Proceeding upstream from Tract 28, topographic parallels within Tract 27 (see Figure 4) suggest that a similar sequence of rapid downcutting of the channel (ca. 7500-7000 B.P.), followed by a fairly rapid channel migration and flood plain development (ca. 7000-5000 B.P.) occurred. Subsequent modification of this flood plain has probably been limited to erosional scouring along the interior margin (see Figure 10) and by a fairly thin alluvial build-up along the edge towards the river. All cultural items recovered during an intensive surface walkover of a plowed field located here are believed to date more recently than approximately 1200 B .P.

The developmental sequence characterized Tract 17 is substantially more difficult to document. (see Figure 57). No geomorphology studies were carried out here and, although prehistoric artifacts were recovered in three discrete areas--VT-FR-131, 132 and 133--no occupation could be dated. Surface relief, variations in soil types and a sequence of meander scrolls visible in aerial photographs suggest a general pattern which is not unlike that for Tracts 28 and 27. In Figure 9 the southern edge of the river channel at ca. 8000 B.P. is placed in this position for several reasons. First, topographic relief is from 2-4 feet higher to the south of the proposed lee edge of the channel than to the north, thus suggesting channel downcutting. Second, the soils to the south of this proposed channel margin developed from a different alluvial sequence than those to the north--Deerfield loamy fine sands versus Ondawa Variant soils (USDA 1979: Plate 10). Third, north of this channel margin a series of meander scrolls run in partial arcs across the broad flood plain in a north-to-northwesterly direction, thus indicating the direction of channel movement and the temporal priority of an earlier channel to the south. The post-8000 B.P. channel projections proposed in Figure 9 are hypothesized on the basis of the sequence of meander scrolls

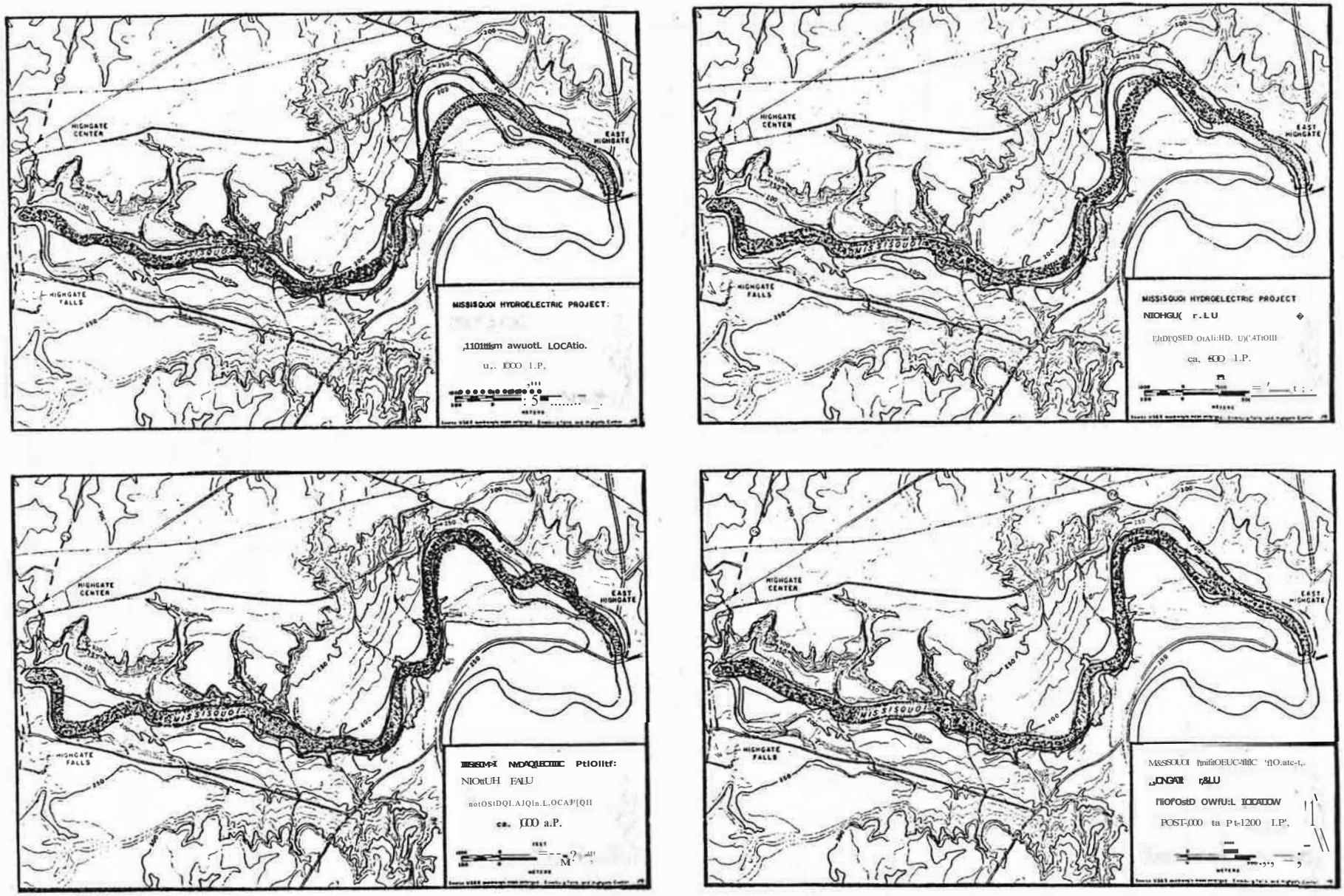


Figure 9. Changing River Channel Locations: 8000 B.P. to Pre-1200 B.P.

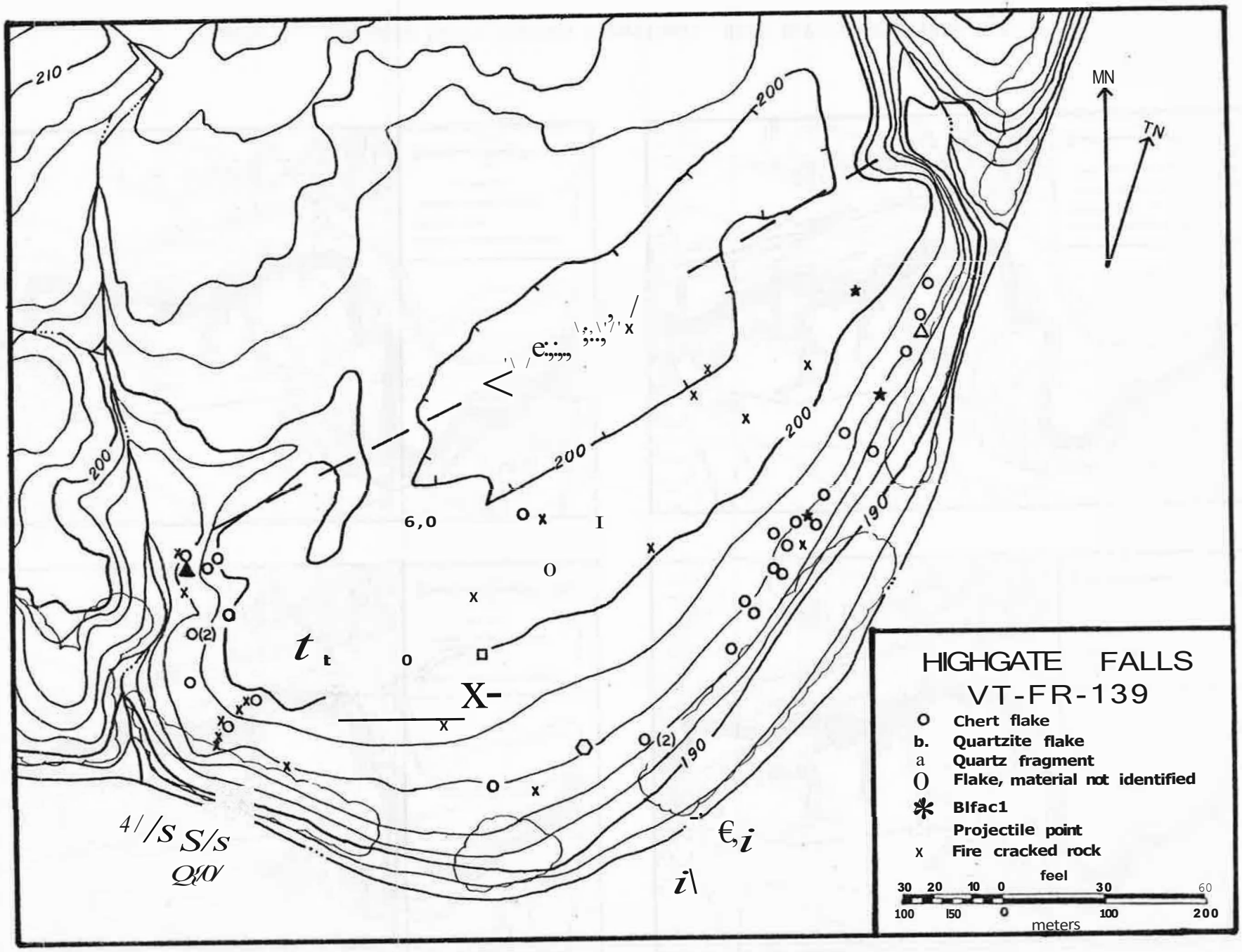


Figure 10. Artifact Distributions from an Intensive Surface Walkover of VT-FR-139.

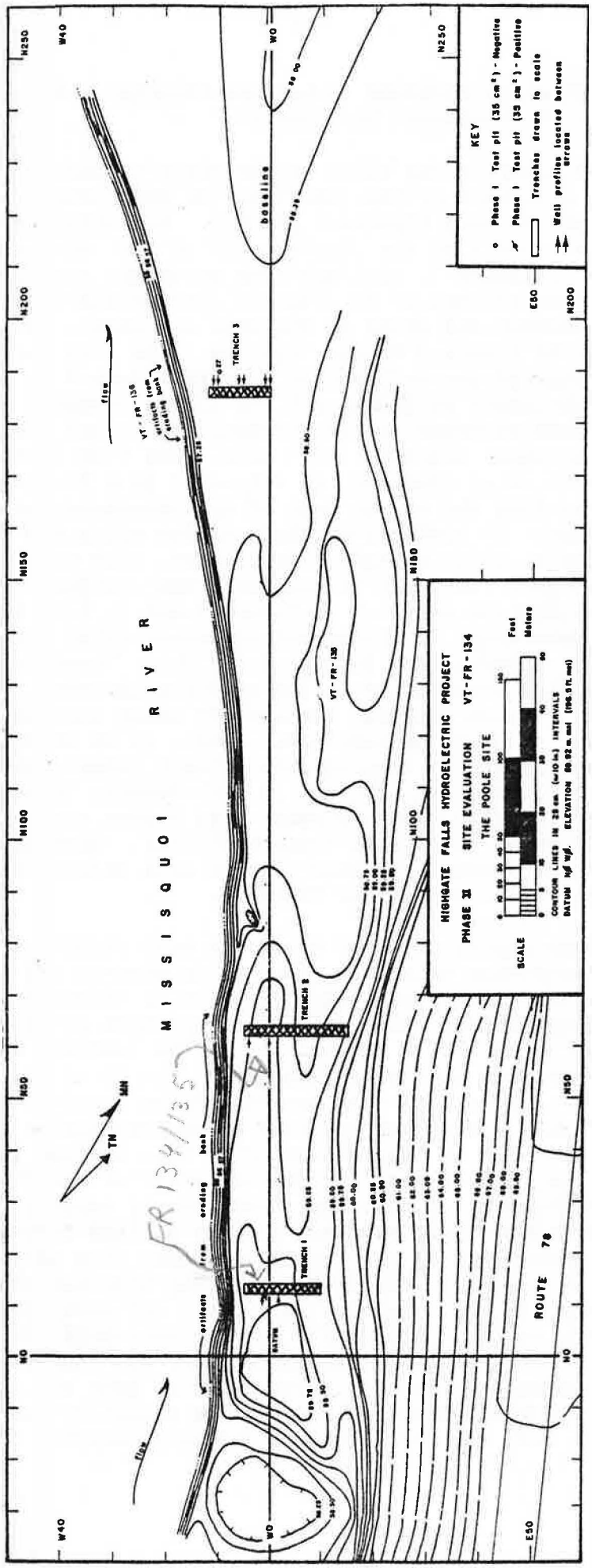

KEY
Phase I Test pit (35 cm²) - Negative
Phase I Test pit (35 cm²) - Positive
Trenches drawn to scale
Well profiles located between arrows
HIGHGATE FALLS HYDROELECTRIC PROJECT
PHASE II SITE EVALUATION VT-FR-134
THE POOLE SITE
SCALE
Feet
Meters
CONTOUR LINES IN 25 cm. (=10 in.) INTERVALS
DATUM M.S.L. ELEVATION 88.92 m. msl (196.5 ft. msl)
MISSISQUOI RIVER
ROUTE 78
TRENCH 1
TRENCH 2
TRENCH 3
VT-FR-138
VT-FR-135
TN
MN
baseline
flow
N250
N200
N150
N100
N50
N0
W40
W0
E50

Figure 11.

and the alluvial sequences recorded in backhoe trenches which were excavated across the river to the northeast in Tract 24.

Three backhoe trenches dug close to the river's current banks were used to record the structure of the rather narrow and lowlying flood plain which comprises Tract 24 (see Figures 4 and 11). The stratigraphic sequences visible in Trenches 1 and 2 at the southern end of the terrace are different from that recorded in Trench 3, although both sequences developed in the same general environment--that of an alluvial flood plain which formed as the river channel downcut and moved to the west and north. One of the more visible differences of Trench 3 versus Trenches 1 and 2 is the vertical and horizontal homogeneity of the sedimentary beds in Trench 3 in contrast to the more variable sequences in Trenches 1 and 2. In Trench 3 detailed vertical profiles were recorded at the western, middle and eastern ends (see Figure 12). Sediment samples (n= 35) were drawn from distinct alluvial beds, correlated with these profiles and subjected to a textural analysis. All samples, whether from the top or base of the sequences, were well sorted silty very fine sands. No vertical disconformities along the length of the trench were apparent; color variation is limited, with sand units ranging from light brownish grey (10YR6/2) to greyish brown (10YRS/2); no argillic horizon containing lamellae exists. In Trench 1 and 2, both the depositional sequences and the subsequent developmental processes which acted on this soil body are highly complex (see Figures 13 and 14). There is neither vertical nor horizontal homogeneity in the profiles recorded. What is characteristic are 1) great textural variability among individual beds--from silty very fine sands to medium/coarse sands, 2) an argillic horizon with prominent lamellae at the western ends of each trench, and 3) intense mottling throughout the eastern portions of each trench, in conjunction with a break in the vertical sequence where sand bodies change from light yellowish brown (10YR6/4) to greyish brown (10YRS/2). Although the formational and developmental processes are not well understood, they certainly contrast with those typical of Trench 3.

From an archaeological point of view, the most significant question generated by the difference in trench profiles is whether all portions of Tract 24 formed during roughly the same period or at different times. The preliminary data suggest that the northern and southern portions are of different ages (see Figure 11). In addition to the contrast in soil profiles, it is also apparent that the elevation of the flood plain in the vicinity of Trench 3, as well as that portion of the flood plain to the north, is from 2-4 feet lower than the area which encompasses Trenches 1 and 2 (see Figure 11). It is hypothesized that this limited topographic disconformity, in conjunction with the dissimilarity of trench profiles, is temporally significant. If this interpretation is correct, and given what can be reconstructed about temporal changes in land forms from Tract 28, the area at the southern end of the terrace may date from the period of rapid flood plain development (ca. 7000-5000 B.P.) hypothesized for Tracts 17, 27 and 28, while, at the same time, the river may have flowed in the area which currently contains the middle and northern portions of this flood plain (see Figure 9). The age of development for the southern portion is suggested by the presence of fairly coarse alluvial beds and the occurrence of the argillichorizonswhich indicated relative stability and considerable age. Subsequently, both the river channel and an associated flood plain

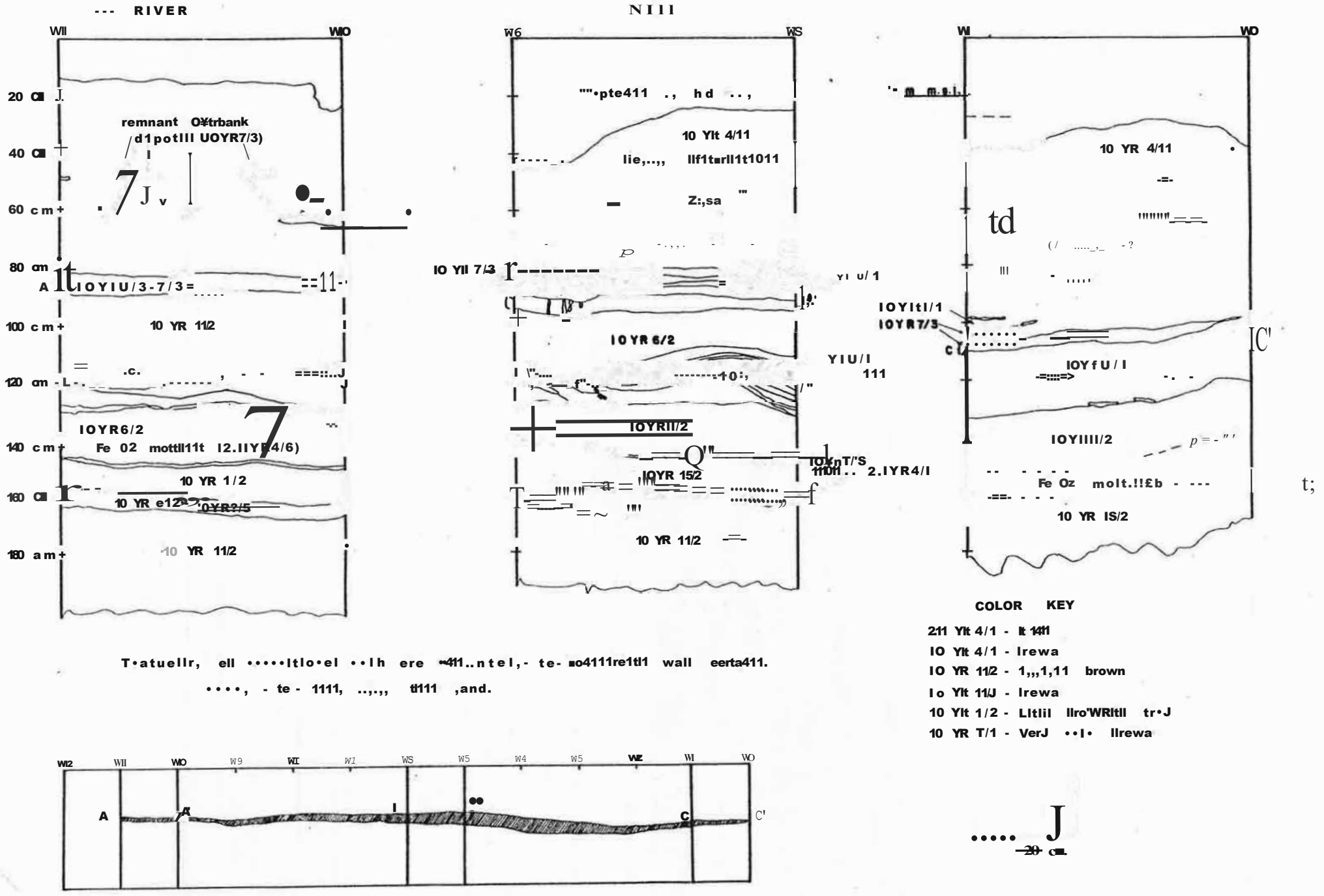


Figure 12. VT-FR-134: North Wall Profile Sections of Trench 3.

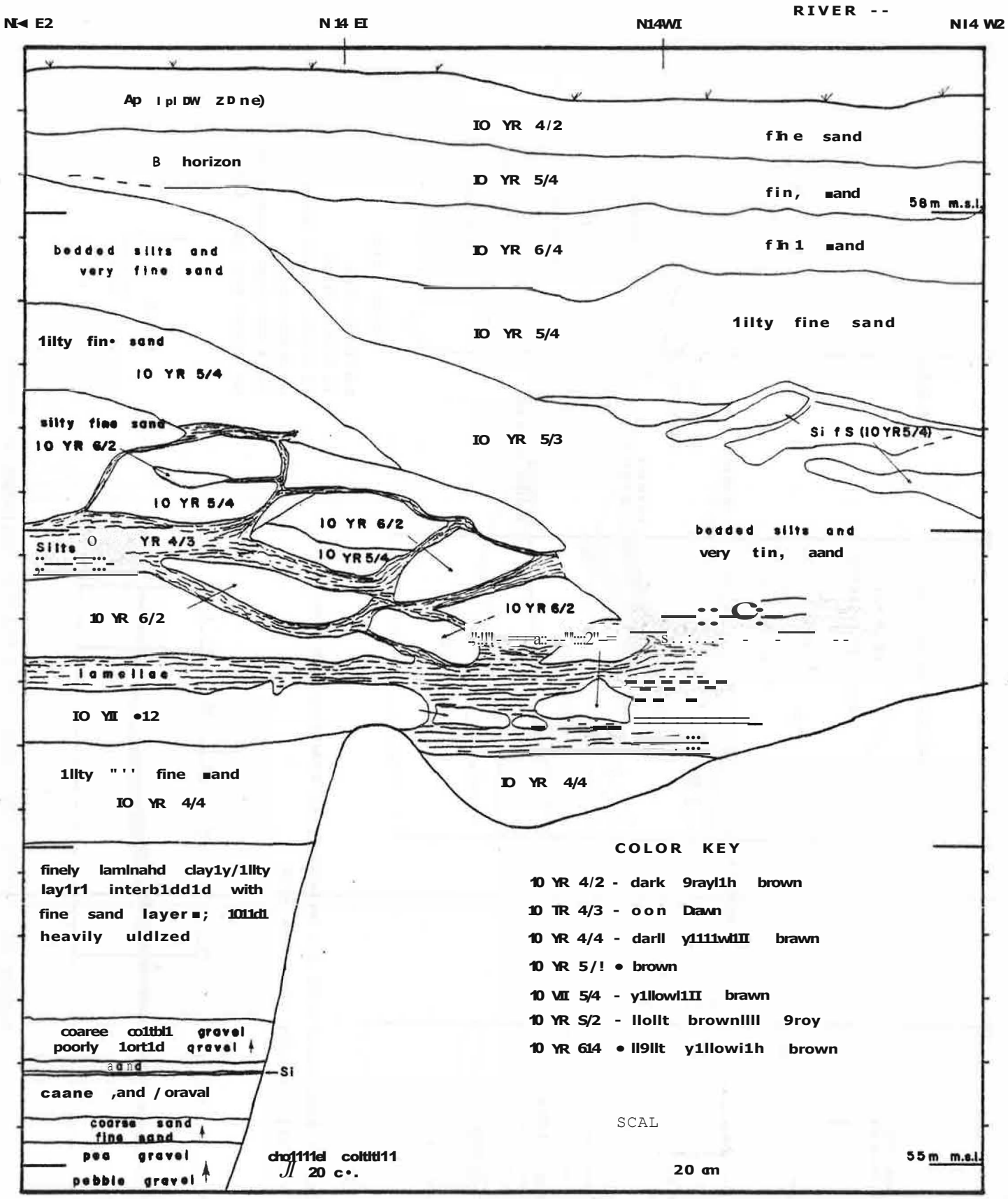


Figure 13. VT-FR-134: South Wall Profile Section from Trench 1.

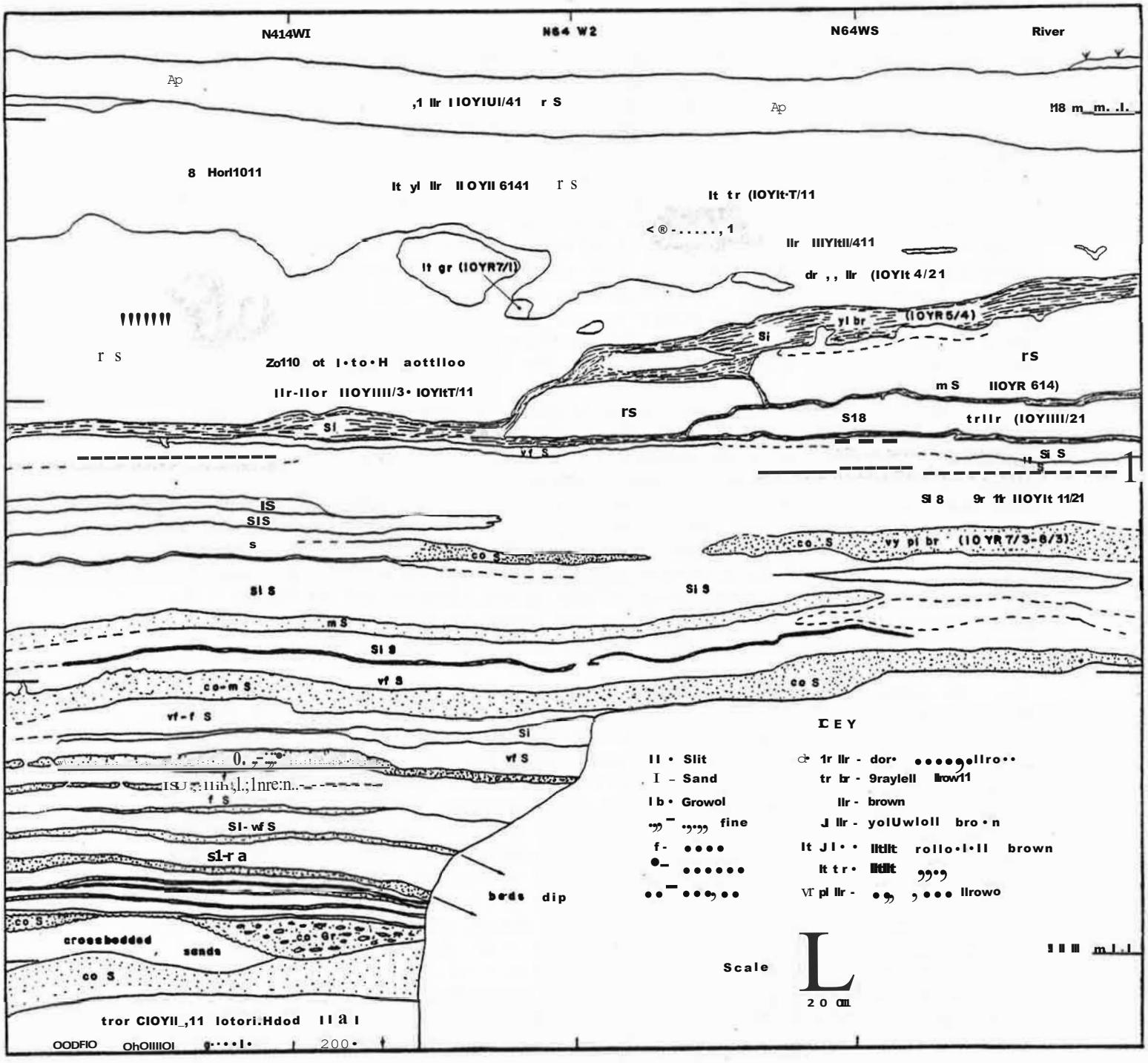


Figure 14. VT-FR-134: South Wall Profile Section from Trench 2.

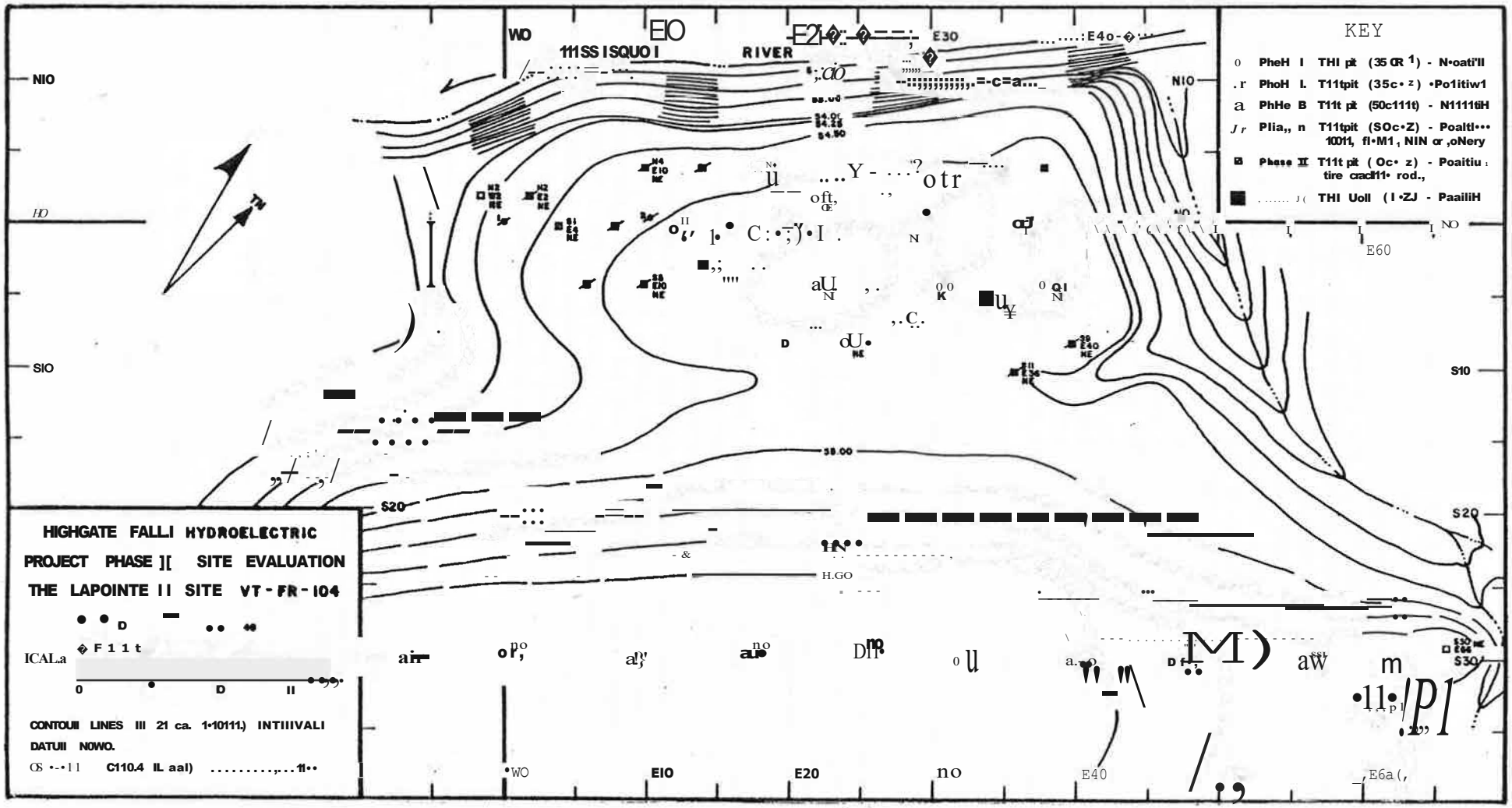
developed in a westerly direction, only to be partially eroded during modern times.

Based on the archaeological evidence, this general sequence may be partially substantiated. One or more Middle Woodland period occupations (ca. 1200-1000 B.P.) were identified in the area evaluated with Trenches 1 and 2--VT-FR-134, 135; no evidence of contemporaneous sites was found to the north. However, although the cultural data are very limited due to loss through heavy bank erosion along the middle and northern segments of the flood plain, at least one more recent archaeological site, dating to roughly 700 B.P., did exist northwest of Trench 3. The fact that this latter occupation may not have taken place until the northern portion of the flood plain stabilized, this section of flood plain being too susceptible to flooding during an earlier period, also suggests a different developmental history for the two areas. (Considerable resolution could be obtained if an additional backhoe trench could be dug between Trenches 2 and 3 to test for a structural disconformity in the profiles and by submitting two logs forC-14 dating which were recovered from the eastern end of Trench 2.)

Downstream from Tract 28, establishing the developmental sequences for various land forms is equally difficult given the lack of temporal controls. Flood scouring is evident in some areas and may still occur during periods of high water. Bank slumpage is also characteristic along this portion of the river. These factors compound the problems of reconstruction, because they have altered earlier topographic configurations. However, only three physiographic features concern us from an archaeological standpoint. These are 1) a narrow alluvial terrace which runs for several thousand feet along the south bank of the river (Tracts 3-8 on Figure 4), 2) a remnant terrace which lies above the lower terrace (also Tracts 3-8), and 3) a large flood plain (Tract 1), again on the south bank.

No geomorphological profiles have been obtained from any segment of the low terrace (Tracts 3-8), except in the upper 60 cm (2 feet) of the test pits where processes of soil development have obscured the depositional record. It is apparent from river bank cuts, however, that the terrace was formed from alluvial sediments which overlie older channel gravels. Whether on the upstream or downstream ends of this terrace, surface elevations are nearly identical, clustering within a foot or so of the 180- ft. m, s. L (55 m) contour interval. Above this terrace, remnants of an earlier terrace were recorded at VT-FR-104 (see Figure 15) at an elevation of roughly 184 ft. (56 m). Dissection of this terrace and the hillside above by small, intermittent streams, as well as the effects of downslope wash, tend to obscur this terrace. In addition, this area is in a thick stand of hemlocks and the 2-foot contour maps used for this project fail to record this feature, because the maps were produced from aerial photographs. Currently the east-west limits of this higher terrace are unknown, although they probably extend from VT-FR-104 (Tract 4) eastward to the fall line in the river adjacent to VT-FR-106 (Tract 8). In fact, VT-FR-106, lying at an elevation of 185 ft, is probably situated on this topographic feature.

The temporal and geomorphological controls for determining when either terrace was established are lacking. Neither topographic feature can be extended to upstream areas where more detailed information is available, because the river drops some 10-12 ft. (3-4 m) through a series of


KEY
PheH I THI pit (35 OR 1) - N•oati'll
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PROJECT PHASE][SITE EVALUATION
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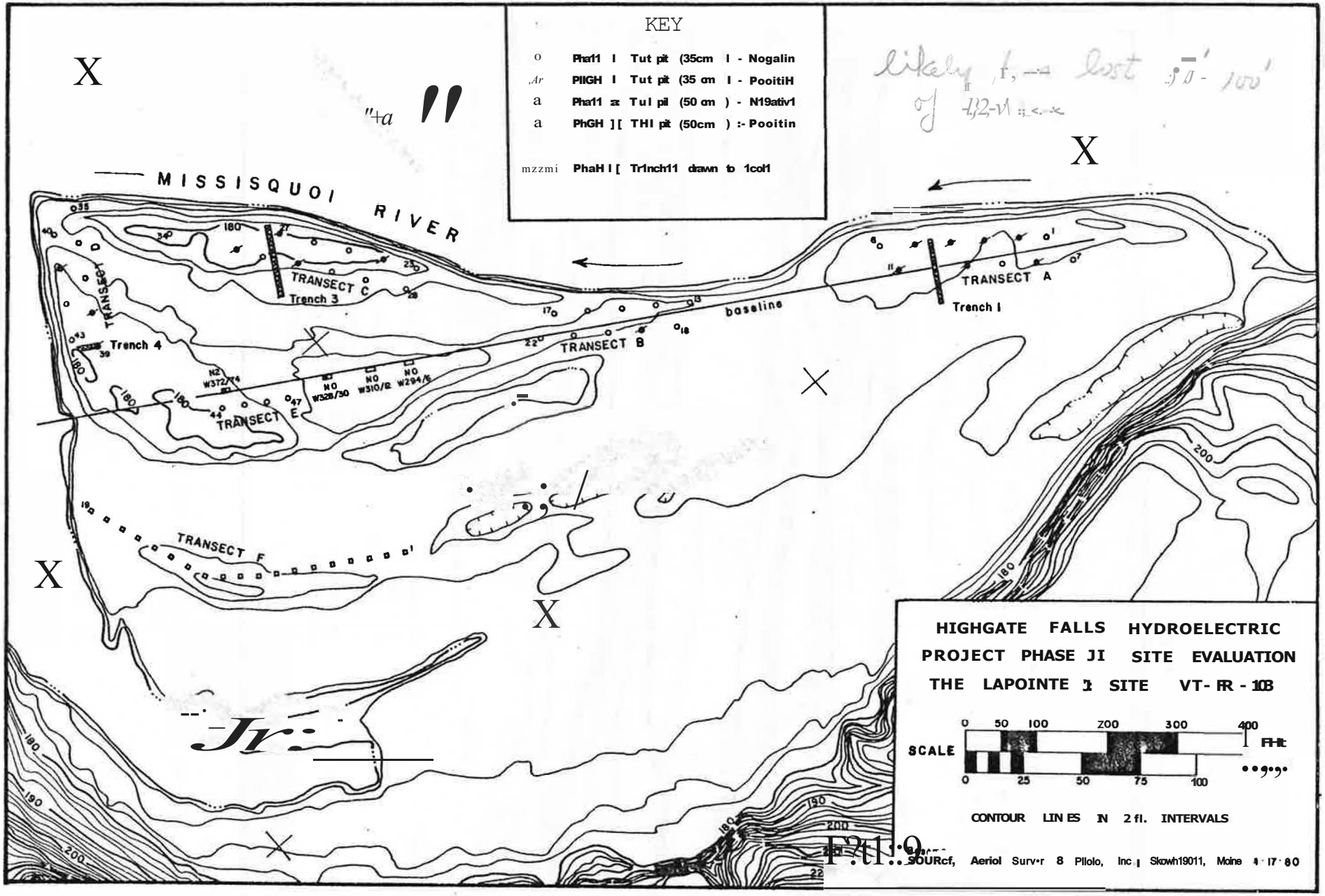
Figure 15.

rapids between here and Tract 28. Nonetheless, the relationship of the low terrace to the current river channel, as well as the topographic relationship between the lower and higher terrace suggest similar formational processes characteristic of Tracts 28, 27 and 17. Speculatively then, it is suggested that the higher terrace developed in the period between 7500 and 8500 B.P., i.e. it is roughly contemporaneous with the high alluvial terrace in Tract 28 which lies between 196 and 200 ft.m.s.l. If so, similar 3-4 ft. (1.25 m) drops in elevation between the high terrace and the broad flood plain in Tract 28 and between the higher and lower terraces at VT-FR-104 suggest the 7000-5000 B.P. period as that when the lower terrace was formed. Another factor also suggests contemporaneous landscape development, although the evidence is certainly circumstantial. Only Middle-Late Woodland period (post-1200 B.P.) settlements are known to occur on either the low flood plain in Tract 28 or on the lower terrace at VT-FR-104. Archaic period (ca. 8000-4000 B.P.) settlements are thought to exist on both the high alluvial terrace within Tract 28 and on the higher terrace at VT-FR-104. Whether this correlation is significant will have to be determined by other data.

The last physiographic feature to be discussed--a broad flood plain at the western end of the project area (Tract 1)--exhibits a somewhat different history from that of the flood plains upstream. Three backhoe trenches were used to acquire stratigraphic information (see Figure 16). The recorded profiles, in conjunction with landscape features and the obvious fact that the river channel once flowed along the southern edge of the flood plain rather than to the north as it does today, ?,rovide the interpretive information.

A series of east-west trending levee and swale features which run in a partial arc from north to south across this flood plain are believed to indicate a sequential movement southward of a former river channel. The ridges represent near-channel segments of the associated flood plain which formed subsequent to channel migration. (Although the swales may have been deepened due to flood scouring in the past, they have also tended to collect alluvial sediments in recent centuries, particularly at the eastern end of the flood plain. The ridges seem to be structurally less affected.) Added support for a southward migration of the channel comes from two factors. First, in the wall profiles of Trenches 1 and 3 which trend north-south (see Figures17 and 18), lower alluvial beds dip fairly steeply to the south, thus indicating the direction of the channel when these beds were deposited, Second, the remnants of the former channel are still clearly visible at the base of a high bluff which forms the southern limit of the flood plain. On the western edge, flood deposition has been insufficient to fill the former channel and, with the dam currently operating just downstream, standing water is encountered. On the eastern or upstream end of the flood plain, the remnant channel has been filled with alluvial sediments. This infilling is evident in the profile from Trench 1 (see Figure 17) where the upper 1.5m of alluvial beds dip only slightly, in contrast to the steeper dip of the lower beds formed during the lateral migration of the older river channel.

What is obvious from the present configuration of the river channel is that at some point the river breached this old flood plain and established its present channel. Although temporal controls are lacking, the geomor-


KEY
MISSISQUOI RIVER
TRANSECT A
Trench 1
TRANSECT B
baseline
TRANSECT C
Trench 3
Trench 4
TRANSECT E
TRANSECT F
HIGHGATE FALLS HYDROELECTRIC
PROJECT PHASE JI SITE EVALUATION
THE LAPOINTE 1 SITE VT- FR - 103
SCALE
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0 25 50 75 100
CONTOUR LINES IN 2 fl. INTERVALS
SOURCE, Aeriol Surv•r 8 Pilolo, Inc | Skowh19011, Maine 4 17 80

Figure 16.

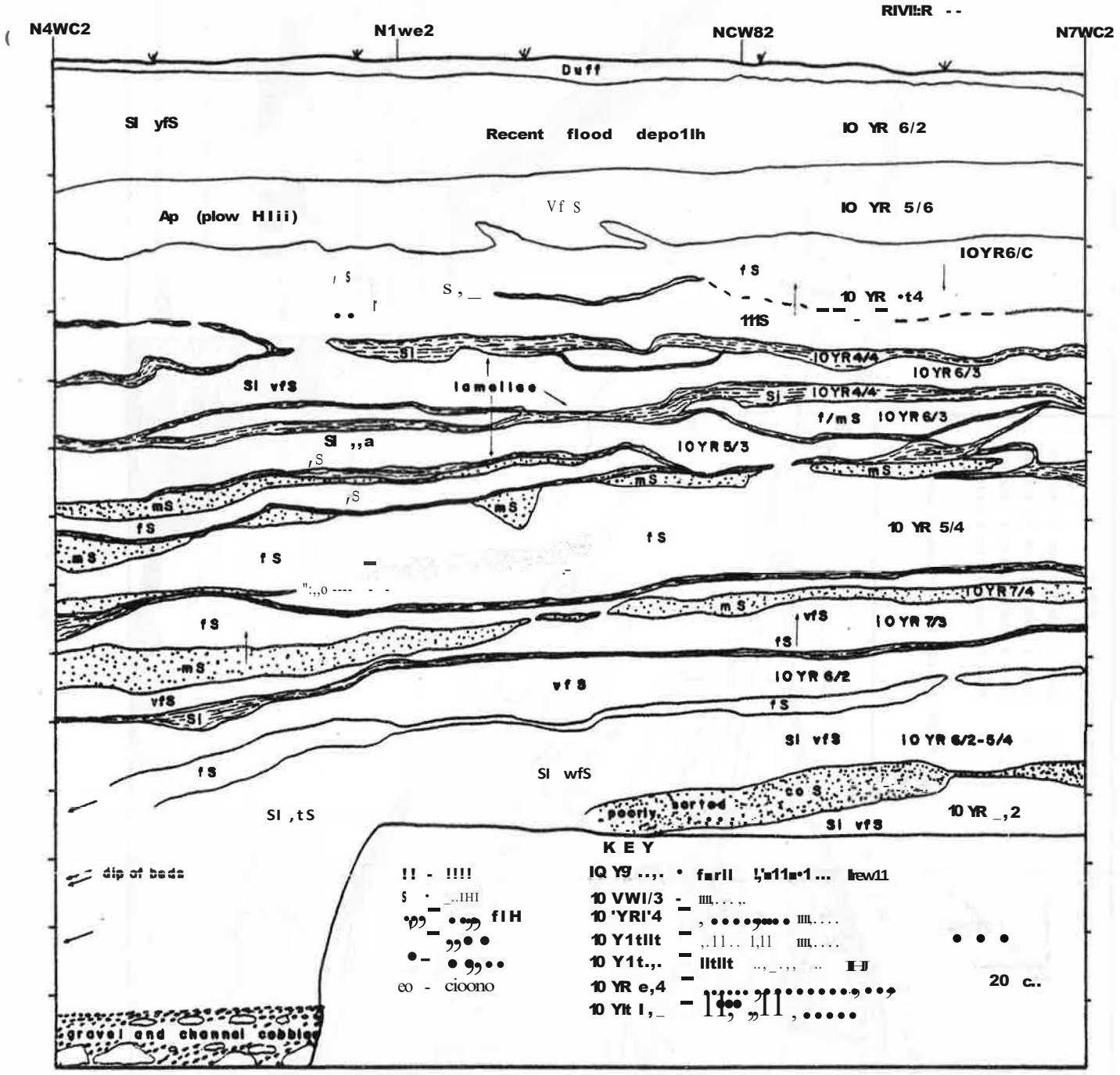


Figure 17. VT-FR-103: West Wall Profile Section of Trench 1.

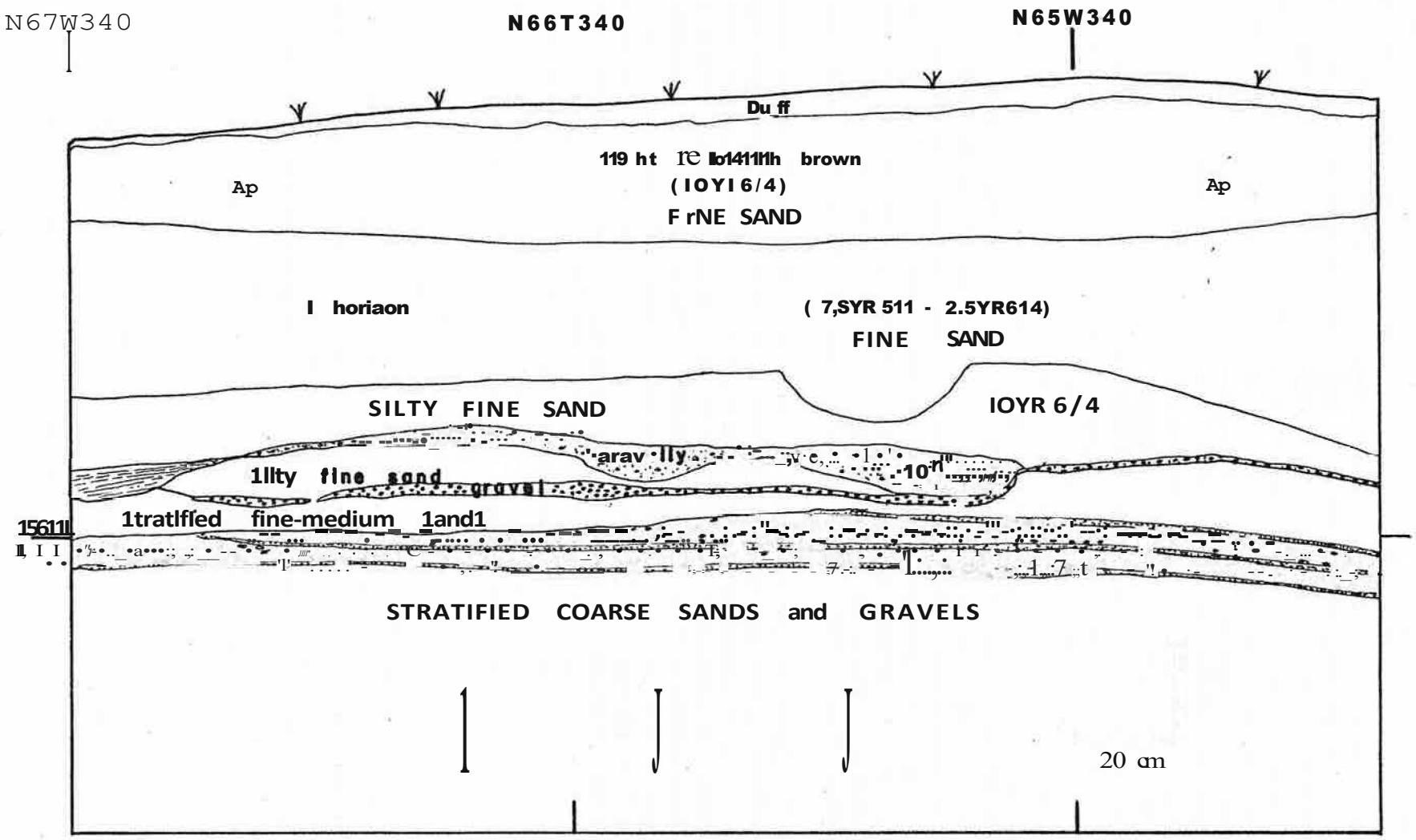


Figure 18. VT-FR-103: East Wall Profile Section of Trench 3.

phology and surface features indicate that the following is a reasonable working model (see Figure 9). First, because the alluvial beds recorded near the current river bank in Trenches 1 and 3 dip away from the present channel, the starting point of early channel migration must have been north of the present river bank. In fact, unless some mid-channel island were involved, the relic flood plain must have once been attached to the north bank of the river. Second, it is assumed that the thinly bedded alluvial sequence recorded on the high alluvial terrace in Tract 28 (Trenches 1, 2-Extension, and 4-Extension) is typical of depositional sequences dating to the 7500-8500 B.P. era. If this assumption is correct, the lack of any such sequence here suggests that Tract 1 dates to a post-7500 B.P. period. The only segment of Tract 1 which could even approach an earlier date of development is the highest ridge (elevation 181 ft m.s.1.) at the western end where Trench 3 exposed a thin alluvial sequence of light yellowish brown (10YR6/4) silty fine sands overlying stratified pea gravels and sands at a depth of only 3 ft (90 cm) (see Figure 18). Third, because it can be demonstrated that significant channel migration and flood plain development occurred between 7000 and 5000 B.P. within Tracts 28 and 17, it is logical to assume that Tract 1 was also established sometime during this two thousand-year period. This assumption is further substantiated by the presence of thick alluvial beds of fine to medium sands exposed in Trench 1--beds which are very reminiscent of those in Trenches 2 and 4 in Tract 28--as well as by the existence of an argillic horizon where lamellae are common (see Figure 17).

The question now arises as to when this flood plain was breached. While there is the odd chance that the flood plain was truncated towards the end of its development (ca. 5500-5000 B.P.), it is expected that with 5000 years of inactivity infilling of the abandoned channel would have been much more complete than is evident today.. Therefore, it is hypothesized that rechannelization occurred sometime between 4000 and 1200 years ago. Archaeological data tend to support this idea, because if it is assumed that aboriginal communities who used the Missisquoi River extablished their camps primarily adjacent to the river--a pattern seen repeatedly in this and other watersheds--then the more recent date is suggested by the fact that post-1200 B.P. archaeological sites were identified adjacent to the current channel, but are missing in the interior of this flood plain. The post-4000 B.P. date is indicated by the developmental sequence present in Tract 28 where rapid channel entrenchment can be inferred during the period between roughly 5000 and 4000 B.P., followed by one or more eras of heavy flooding which left erosional scars along the back side of the flood plains in Tracts 28, 27 and probably 17. Finally, within the last few centuries, overbank deposits related to the present channel, including some which contain ice rafted cobbles, have produced some structural build-up of sediments on the eastern end of Tract 1. Flood waters have also caused heavy bank slumpage and the subsequent loss of archaeological data through erosion along this segment of the river as well.

In summary, there is sufficient evidence for establishing the general developmental sequences of specific landscape features within this portion of the Missisquoi valley. In turn, because human exploitation and occupation of any specific physiographic feature could not have occurred until that feature was developed, a temporal and spatial framework for evaluating pre-

historic settlement patterns can also be established for the project area. Because the ultimate purpose of this- evaluation is to determine the effects of expanding the hydroelectric facilities at Highgate Falls, discussions are limited to those areas which lie below 200 ft (61 m) m.s.1.--the maximum elevation of the proposed impoundment.

First, if they exist at all, remnants of very early alluvial terraces and hillsides dating to a pre-8500 B.P. period are likely to be encountered only in the lower 1.5 miles (2.4 km) of the project area and only on the south side of the river. On the north side, steep escarpments rise well above the 200-foot contour. Limited archaeological testing during the initial reconnaissance survey in 1980 of Tracts 2A and 8A (46 test pits) found no evidence of prehistoric occupation in areas of 0-5% slope between elevations 190-202 ft m.s.l. Thus, it is unlikely that Paleoindian and Early Archaic period sites dating betweenl0,500 and 8500 B.P. would be encountered within the Highgate Falls Prehistoric Archaeological District.

Second, at least three narrow to broad alluvial terraces have been identified which should have been available for prehistoric occupation during or shortly after the 8500-7500 B.P. period. These terraces lie: 1) on the southern margin of Tract 17 at an elevation of 200-204 ft.m.s.l.; 2) within higher areas of Tract 28 at elevations of 196-200 ft.m.s.l.; and 3) along the valley flank on the south side of the river downstream from Tract 28 in Tracts 4-8 at an approximate elevation of 184-186 ft.m.s.l. Given the possibility of a period of rapid downcutting and erosion between 7500 and 7000 B.P., all Middle Archaic and terminal Early Archaic period archaeological sites should be confined to these high terraces. Whether the 3-4 sites associated with these terraces at VT-FR-104 (Tract 4) and VT-FR-140 (Tract 28) are actually this old has yet to be determined.

Third, the large alluvial flood plains or narrow alluvial terraces contained within Tracts 1, 3-8, 17, 27, 28 and the southern portion of Tract 24 went through a process of rapid, if somewhat sporadic,development between roughly 7000 and 5000 B.P. Thus, archaeological sites dating to anytime after 5-6000 B.P. could be encountered on any physiographic feature within the project area, from the low flood plains to the higher and older alluvial terraces.

Fourth, after roughly 5000 B.P., the river continued to downcut and became entrenched. In fact, it seems to have become so entrenched relative to the height of the adjacent flood plains in Tracts 27, 28, 17 and the southern portion of Tract 24 that during a subsequent period characterized by at least several major floods, flood deposition within these tracts was limited. Data derived from the backhoe trenches in Tracts 24, 28 and 1 indicate that post-5000 B.P. alluviation has buried archaeological deposits no deeper than 3 ft, (1 m), and, in most cases, at less than 2 ft. While flood deposition may have been infrequent, thus having little effect on archaeological deposits, the erosional scouring evident on interior portions of Tracts 1, 17, 27 and 28, the dramatic rechannelization of the flood plain which lay north of Tract 1, and the ongoing slumpage and erosion evident along the present river bank lead to the conclusion that some post-5000 B.P. prehistoric sites have been destroyed, either in whole or in part. In fact, all datable sites which have been located immediately adjacent to the present river channel were occupied more recently than 1200 years ago.

GENERAL SAMPLING APPROACHES

This section describes some of the basic sampling approaches which were employed during the summer of 1982. Technical problems and the modifications made in the initial sampling techniques are discussed as well. More detailed descriptions of the work carried out at individual sites is contained in subsequent sections.

Intensive subsurface sampling was undertaken at selected sites within the lower, middle and upper portions of the Highgate Falls Hydroelectric Project area--an area encompassed within the Highgate Falls Prehistoric Archaeologi al District. As noted in the preceeding section, Tracts 1 and 4 (containing VT-FR-103 and 104) are located in the lower segment of the project area, Tracts 28 and 27 (containing VT-FR-140 and 139) in the middle segment and Tract 24 (containing VT-FR-134-138) in the upper segment (see Figure 4). These study units were chosen because a high percentage of test-pits excavated within the units in 1980 were culturally positive and because these tracts encompass physiographically different settings--from a narrow, low riverine terrace to broad flood plains backed by higher and older alluvial terraces.

To insure good horizontal and vertical control for the work undertaken at each site, the first activity completed was to prepare a detailed topographic map. Datum points were established and tied into known bench marks when possible. A baseline was then established which ran roughly parallel to the river channel. (For this reason, "grid-north" may not correspond to true or magnetic north on the site maps.) Because slight changes in relief within a site could reflect erosional scouring or older terraces, ·25 cm (ca.10 in) contour intervals were employed for Tract 4 (VT-FR-104), Tract 24 (VT-FR-134) and Tract 28 (VT-FR-140). Because relief was less important and the land was completely cleared of vegetation within Tract 1 (VT-FR-102), the original 2-foot contour map produced by aerial photogrammetry was used. With the maps and grids established, all excavation units could be identified as lying a specific number of meters N and S or E and W of the major grid axis. Thus, the designation N6E4 indicates that the NE corner of the excavation unit was 6m north and 4m west of the primary grid datum. All excavation units, whether individual 50cm test pits or trenches, are referenced by this convention.

An attempt has been made to provide as much information as possible concerning the extent of testing which has taken place at each site. For this reason, the locations of both the reconnaissance survey test pits completed in 1980 and the intensive site evaluation testing units have been incorporated in the final maps. (The original test pits are depicted as small circles, with the solid circles indicating that prehistoric cultural material was encountered. These test pits are not drawn to scale. Test units excavated in 1982 are marked as squares or rectangles. The larger test units are drawn to scale.)

Individual site evaluations focused on defining the structural and cultural characteristics of each site. Specifically the following questions

were addressed. Do vertical sequences of prehistoric occupation levels or surfaces exist at any site? If there are buried components, how deep are they? Can approximate horizontal dimensions of sites be determined? What is the range and density of artifacts and features present at individual sites? What is the probable temporal range of any sites which are to be found in the project area? If sites are shallow, how much post-depositional disturbance has occurred? Do the horizontal artifact and feature patterns which archaeologists rely upon to reconstruct some types of prehistoric activities still exist? As previously discussed, answers to two additional questions -- What are the geomorphological characteristics of various land forms and are different physiographic features associated with distinct periods of prehistoric occupation? -- were partially derived from the excavation of eleven backhoe trenches within three of the study units (Tracts 1, 24 and 28).

In an attempt to develop as much information as possible, it was proposed to use these backhoe trenches for multiple purposes. First, if 2m-wide trenches were excavated through known sites, not only would the 2.5-4m deep trenches provide geomorphological information, but if the trench walls were cleaned, buried artifacts and features might be exposed. Trench lengths totalled 247m, thus providing vertical exposures of 494m through portions of Tracts 1, 24 and 2 or VT-FR-103, 134 and 140 respectively. Second, in order to recover as large a sample of cultural artifacts as possible it was proposed that the backdirt from the trenches would be intensively sampled by screening it through 1/4" mesh screens.

Field experience soon identified the following problems with this excavating technique. 1) - Limited vertical and horizontal control was to be obtained by having the backhoe remove trench fill in 2 x 2m horizontal by 50-100 cm vertical units and piled separately. The tremendous volume of trench file, however, made it possible to sample only a small percentage of the total. 2) Any vertical breaks in cultural occupations, unless separated by thick alluvial deposits, would be impossible to identify. 3) Because the trenches were excavated through those portions of sites known to contain high artifact densitites, cultural features might also be present. If so, and if they lay within the trench, such features would be completely destroyed before discovery.

In order to overcome these problems, several modifications were made in the approach. First, the original sampling completed in 1980 identified cultural deposits within the top 30-70cm at most sites. Through experimentation it was found that once the duff or heavy grass mat was removed with the backhoe, the top 30-50 cm of soil which contains artifacts could be removed and screened nearly as rapidly by using shovels as with the backhoe. This procedure was thus adopted because it greatly increased the interpretive potential of the recovered data. By using shovels, for example, horizontal control could be significantly increased by sampling by 50cm or 1m blocks within the trench boundaries, rather than by $4m^2$ units which is about the smallest unit the backhoe could manage. By skinnning with shovels, such features as cooking hearths could also be identified and their contents removed. (Such tight horizontal control has proven to be critical. It is now known that small clusters of artifacts and features do exist in some places, thus making it possible to delimit discrete activity areas.} Second, testing the upper portions of trenches was generally begun by using 2x2m control units at intervals along the length of the trench. Where a high density of artifacts or features was encountered, the top portion of the entire trench was likely to be excavated. Where artifact density was low and unclustered, sampling usually

stopped with the control pits. Third, once the artifact bearing level had been partially or totally removed along the length of a trench, the backhoe was then used to sample the lower strata. It was at this point that the trench walls could be cleaned to expose deeply buried features or artifacts. This sampling strategy was used exclusively within Tract 24 (VT-FR-134), along the near-channel portion of Tract 1 (VT-FR-103) and within the low flood plain in Tract 28 (VT-FR-140) . In conjunction with other techniques, this approach was used on the higher alluvial terrace in Tract 28.

Once it became apparent from the backhoe trenching that distinct alluvial deposits defined landforms 0f differing ages,an effort was made to sample some topographic features which had been only mini ally sampled or not tested at all during the initial reconnaissance survey, All such topographic features lie at some distance from the present river channel. Because it had been determined by this time that deeply buried cultural deposits were not likely to occur in such locations, 50cm shovel test pits placed at 8m intervals along extended transects were felt to be adequate for the task of determining whether or not sites exist on these older landforms. This approach was used within Tracts 28 and 4 to evaluate early alluvial terraces and within the current flood plain in Tract 1 to test two ridges which are believed to represent former channel margins.

One goal of the site evaluations was to define the horizontal distributions of artifacts and features within several tracts so that estimates could be made of site boundaries. In large site areas, such as Tracts 1, 27 and 28, where multiple occupations had been recognized, an attempt was made to determine the size of more limited clusters of artifacts and features which might represent discrete occupations. In some instances where sites were located on narrow terraces, the 8m interval test pit transects excavated in 1980--which ran parallel to the river channel--in conjunction with the backhoe trenches--which ran perpendicular to the channel--proved adequate for defining the size and some of the internal characteristics of horizontal clusters. This is particularly true for Tract 24 (VT-FR-134), along the present channel portion of Tract 1 (VT-FR-103), and, to a more limited extent, within the lower flood plain in Tract 28 (VT-FR-140).

In two instances --around Trench 1 on the high terrace in Tract 28 (VT-FR-140) and on the low terrace in tract 4 (VT-FR-104)-- a 4m interval grid pattern was employed in an attempt to define the spatial characteristics of artifact scatters. An additional approach used to define horizontal site boundaries and the dimensions of individual artifact clusters involved an intensive surface walkover of Tract 27--one of only two large pieces of agricultural land in the project area.

Finally, a feasibility study was conducted at several sites to determine whether or not a soil phosphate analysis would have utility for identifying areas of cultural activity. It has long been recognized that human occupation of a site will significantly increase the percentages of phosphorus, carbon, nitrogen, calcium, and certain trace elements like copper and zinc in soils. Of all these elements, phosphorus is produced in quantity by decomposing bone, is the most chemically stable, and is subject to little leaching. For this reason, increased amounts of available phosphates at a particular location may indicate former human activity (Cook and Heizer 1965). A quick field-lab test for available phosphates (Eidt 1973; Woods 1974) has been used to produce

"relative-scale" phosphate readings whose distributions could be plotted on maps for this study. The method involves the extraction of phosphates with a solution of HCl and ammonium molybdate, followed by a precipitation with ascorbic acid and water. Although this technique does not provide quantitative figures for phosphate samples, it does allow the technician to define relative increases or decreases in the amounts of P in different soil samples. For this survey,, a nine point subjective scale was used to record phosphate readings. From low to high the readings are: nil, weak-, weak, weak+, moderate-, moderate, moderate+, and intense. In this manner, high to low density or specific activity areas can be roughly delineated. At sites where bone preservation is poor, for example, it was felt that this technique might produce information about the location of butchering and processing areas within the site.

In sunnnary, sampling during the summer of 1982 involved the use of eleven two-meter-wide backhoe trenches totaling 247 meters (810 feet) in length; four 2 x 4 meter shallow trenches, twenty-three 2 x 2 meter units, most of which were dug within trench boundaries; three 1 x 1 meter units; one hundred sixty-two 50 x 50 cm test pits; and the analysis of 219 soil phosphate samples.

In those instances where cultural features--usually cooking hearths--were exposed in either the trenches or the smaller test pits, the soils which fill these features were intensively sampled for organic remains. Bulk samples were water screened through 1/8" mesh in the field, while smaller volumes of soil were returned to the lab for processing as flotation.samples using lmm-mesh screens. An analysis of the recovered bone was conducted by the Project Director, while the floral remains, primarily seeds, have not been identified.

All recovered artifacts have been washed, cataloged and placed in permanent storage at the Department of Anthropology, University of Vermont. All field data records, lab update records and merged catalog files have been computerized and placed on magnetic tapes. Detailed artifact inventories by site can be printed on hard copy if requested.

SITE DESCRIPTIONS AND EVALUATIONS OF SIGNIFICANCE

Introduction

This section of the report deals with each tract or site as an individual unit of study. Sites are discussed in a spatial sequence beginning with Tract 1 (VT-FR-103) in the downstream section of the project area and proceeding upstream to Tract 4 (VT-FR-104), Tract 28 (VT-FR-140), Tract 27 (VT-FR-139) and Tract 24 (VT-FR-134, 135, 136). Brief reference is made to VT-FR-151, 152 and 153, two of which were defined on the basis of artifacts eroding from the river bank in general proximity to VT-FR-104.

As noted in a previous section of this report, the site evaluation program was designed to further explore the significance of a select number of prehistoric sites within this archaeological district. The significance of an archaeological property in the National Register District is determined primarily by the information it contains about the environment, human behavior and cultural change and stability in the past--about community composition, about the manufacturing and subsistence activities which were carried out along the Missisquoi, about short-and long-distance trade, about past societies' relationships to the changing environment of Vermont, etc. In order to deal with these subjects, it is essential to identify what types of information the sites within the District contain.

Archaeological resources may be usefully divided into three major categories: items--things which are normally referred to as artifacts, but also intluding bones, flakes, pollen, seeds, etc; deposits--which generally applies to lenses or fill in various features such as hearths or storage pits; and surfaces or discrete vertical soil units--essentially all two-dimensional "living" or "occupation" levels. Furthermore, all of these resources exist in a three-dimensional context of form, time and space. It is the qualitative and quantitative differences among these categories which allow the archaeologist to make and test inferences about past human populations. (See Figure 5 for further detail.)

There are two additional properties of variation in archaeological resources. The first is clarity, that is, the degree to which archaeological deposits or "living" surfaces can be isolated from one another. Since one of the primary goals of archaeology has been to understand and define the activities which took place at specific sites, as well as the possible variations through time, it is important that artifacts and features which were employed in a number of functions at one period be isolated from artifacts and features dating to earlier or later periods.

The second property of variation is integrity, that is, how good has the preservation of archaeological resources been? What is the condition of the animal and plant remains? How complete is the stratigraphic sequence?

Each site evaluation addresses these issues and is structured in approximately the same format. First, a brief review is made of the sampling results derived from the initial reconnaissance survey conducted in 1980 and/or

of the questions which remained unresolved. Second, the site evaluation program conducted in 1982 is summarized, but with sufficient detail provided so that the reader can assess the adequacy of the field methodology and the conclusions which are derived from the recovered data. Two or more subsections will be found. The first describes the specific sampling scheme; the second describes the sampling results and provides a brief interpretation. Where a large tract is involved, a summary overview may be included. The final subsection evaluates the specific site with respect to the types of significant information which could be gained from further archaeological study.

Background: Reconnaissance Phase Testing Results

A combination of subsurface sampling and examination of the eroding riverbank in Highgate Falls Tract I revealed the presence of this extensive site. The site is situated on a large flood plain at 175-180 feet m.s.1. (54-56m) and 3-5 m above the Missiquoi River, which adjoins the site immediately to the north. Highgate Falls Tract 1, is currently covered with a mixture of pasture grasses and alders. The geomorphological characteristics are described in a previous section of this report. Topographic characteristicscan be seen in Figure 19 .

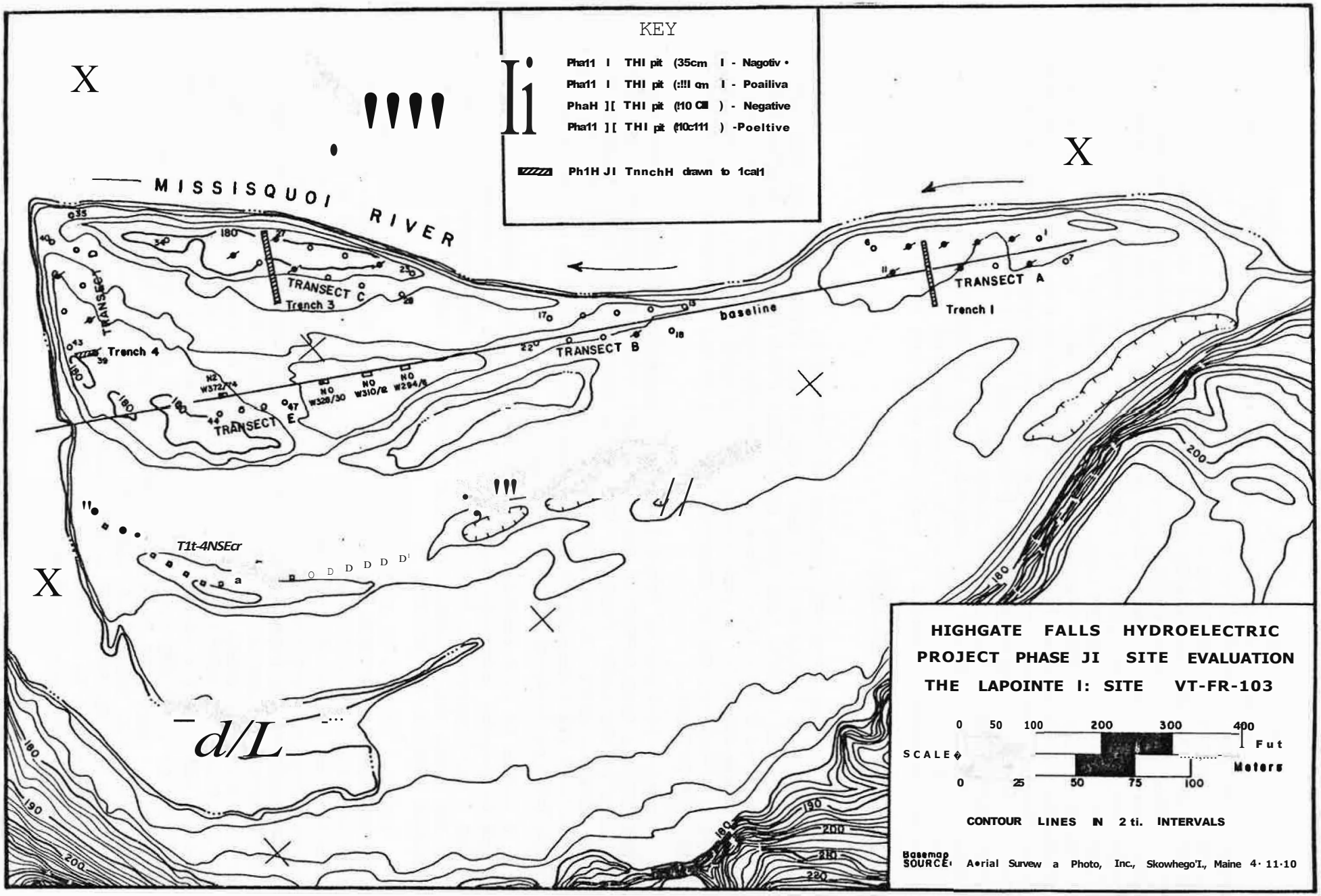
Prehistoric cultural debris was recovered from 15 of 47 test pits in four out of five discrete areas of testing. Each of these four areas, designated A-D (E was sterile), was located on a slight to notable topographic rise in Tract 1 (see figure 14 where Transects A-E are depicced). All four positive areas were located within 25 m of the. Missisquoi River or adjacent to an abandoned channel. On the basis of topography and local drainage, the possibility exists that the four areas represented either one or several separate sites of prehistoric occupation. They were designated as sub '."'eas of one site, however, due to the limited extent of the Phase I testing and the general similarities in lithic material over the entire area. No clear evidence of intact features was noted in any portion of the site.

The total cultural artifact inventory from the initial survey included 27 chert flakes and 10 fire cracked rocks, none of which were temporally or culturally diagnostic. Of this inventory, 4 flakes and 2 fire cracked rocks were collected from the eroding riverbank in Area A, at the eastern end of the site. In addition, 10 flakes and 3 fire cracked rocks were recovered from 7 of the 12 test pits excavated in Area A. For those items with good provenience data, it appeared that all specimens were recovered from a buried plowzone, ca. 12 to 30 cm below surface, vhich consists of bro.wn sandy silt loam.

In Area Ba buried plowzone was not clearly evident. The plowzone seemed instead to extend from 0-22 or 32 cm below surface. A single flake without clear depth association was re overed from one te$t pit out of 10 pits excavated in this area.

R>urof twelve test pits in Area C yielded prehistoric debris, including 9 flakes and 1 fire cracked rock. Stratigraphy in the positive pits consisted of a plowzone horizon of brown sandy silt loam from 0-25 cm below surface. Most debris was encountered in the plowzone, but in Test Pit 22, 3 flakes and 1 fire cracked rock were encountered in the upper 11 cm of the underlying light brown subsoil.

Area D, which adjoined the oxbow channel, produced 2 flakes and 4 fire cracked rocks from the plowzone in 3 of 9 test pits. The plowzone horizon in the positive test pits seemingly extended from ground surface to a variety of depths, including 15 cm, 25. cm, and 40 cm. Although the reasons behind this stratigraphic variability are not clear, it may well be related to topographic position and differential disturbance.


KEY
Pha11 I THI pit (35cm I - Nagotiv •
Pha11 I THI pit (:!!I cm I - Poailiva
PhaH][THI pit (!10 Cll) - Negative
Pha11][THI pit (!10c111) -Poeltive
Ph1H JI TnnchH drawn to 1cal1
MISSISQUOI RIVER
TRANSECT C
Trench 3
TRANSECT A
Trench I
baseline
TRANSECT B
Trench 4
TRANSECT E
T1t-4NSEcr
d/L
HIGHGATE FALLS HYDROELECTRIC
PROJECT PHASE JI SITE EVALUATION
THE LAPOINTE I: SITE VT-FR-103
SCALE
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Basemap SOURCE: Aerial Survew a Photo, Inc., Skowhego'I., Maine 4· 11·10

Figure 19.

Several impressions about the site's cultural and structural characteristics were derived from this preliminary survey. 1) Assuming that the chert flakes and fire cracked rocks recovered indicated prehistoric activities related to stone tool production or reworking and cooking in stone-lined hearths, it was inferred that activities had been carried out at multiple locations within Tract 1. 2) Recognizing the dangers of predicting the contents of a site from the 0.00023% sample which was obtained, artifact density appeared to be low. 3) Limited areas of prehistoric activity appeared to be discretely clustered within the larger tract, with the most intense clustering occurring in the area sampled with Transect A (see Figure 19). 4) All of the cultural artifacts recovered came from fairly shallow depths and, with only one exception, from a plow zone context. 5) It could be assumed that some of the cultural information contained within Tract 1 had been lost because artifacts were recovered from eroded banks along the river. 6) Large areas in the interior of Tract 1 had not been sampled; their archaeological sensitivity was unknown. Subsequent site assessments were designed to evaluate these impressions and to answer a number of questions which had been raised.

Site .Evaluation Program: 1982

Sampling Scheme

Three backhoe trenches, designated Trenches 1, 3 and 4, were excavated perpindicular to Transects A, C and D and to the river bank, and immediately adjacent to one or more test pits which were known *to* contain prehistoric artifacts (see Figure 19). These trenches were employed to evaluate the tract's geomorphology, *to* test for buried cultural ho izons, to expand the artifact inventory, and to determine whether or not concentrations of artifacts were present.

Interior sections of Tract 1 were subsequently evaluated *to* test the archaeological sensitivity of several ridges--features believed *to* be adjacent to a former river channel. Test units away from the river included four 2x4 m trenches along the baseline (N2W372/374, N0W328/330, N0W310/312, N0W294/296) and two test pit transects, F and G, consisting of 50 x 50 cm test pits dug at 8-meter intervals (see Figure 19).

A series of soil samples *to* be run for a phosphate analysis were obtained at 3-meter intervals across the crest of the ridge encompassed by Trench 3 and Transect C, from N65W316 to N65W372. Four samples were taken from the north end of Trench 3. Fo11r samples were taken from two 2 **x** 4 m trenches (N0W294 and N0W310).

Trench 1 (N12W62 *to* S16W62) had a total length of 28 m (see Figure 19). Work proceeded in several stages. 1) Two 2 x 2 m units--N12W62 and N10W62--were used as control pits, with horizontal control maintained by 1 x 1 m subunits (see Figure 19). 1) Level 1, or the plow zone, was removed by shovel scraping after the duff and recent flood overburden had been removed by the backhoe. 2) Subsequently, the backhoe removed the duff from the entire length of the trench, then excavated the plow zone in roughly 2 x 2 m units. Back dirt piles from every other 2 x 2 m unit, beginning with N6W62 and continuing to S16W62, were screened through½;" mesh. In addition, the floor of each 2 x 2 m square was shovel scraped *to* a definite Ap/B horizon interface to check for cultural features which might have been truncated by plowing. None were found. In S4W62, the southern half of the 2 x 2 unit was excavated by hand 20 cm below the plow zone. No cultural material was found. 3) In order to obtain a deep profile in this area, the trench was finally excavated by backhoe *to* a maximum depth of 2.5 m (where old channel gravels were encountered) between N3W62 and N7W62. In addition, a slit trench,

roughly 0.75 to 1.0 m wide and 1.5 m deep, was dug along the west wall of the trench between N3W62 and S16W62. Both walls were cleaned and inspected for cultural artifacts or features. None were found.

Trench 3 (N68W342) had a total length of 30 m (see Figure 19). Work proceeded in the following phases. 1) Three 2 x 2 m units--N68W342, N66W342 and N64W342--were used as control pits, with horizontal control maintained by 1 x 1 m blocks (see Figure 19). 2) Subsequently, the backhoe removed most of the plow zone in 2 x 2 m units for the remaining length of the trench--N62W342 to N38W342. The back dirt was screened through½;" mesh in every unit between N62W342 and N54W342 and the remaining plow zone soil was removed from the trench. Two 1 x 2 m units, N63W342 and N58W342, were taken down an additional 20-30 cm below the plow zone. No cultural material was found. 3) By N56W342, surface elevations decreased substantially as the trench dropped into a flood scour. Shovel scraping of the plow zone ended at N54W342, but the back dirt piles from N50W 42 and N46W342 were screened to check this end of the trench. 4) To obtain a deep profile, the trench was opened between N65W342 and N68W342. It was subsequently expanded to N52W342 so that the dip and textural characteristics of the alluvial beds could be followed.

Trench 4 (N30W414 to N30W430) had a length of 16 m (see Figure 19). Work proceeded in several stages. 1) Initially the trench was laid out and the backhoe stripped off the duff and then removed part of the plow zone in 2 x 2 m units between N30W430 and N30W414. First stage sampling involved the screening of every other back dirt pile, beginning at N30W430 and ending at N30W422 (see Figure 19). 2) The trench floor of each of these units was also shovel scraped to the B horizon interface to check for cultural features. All soil was screened, except for that from N30W428 and N30W424. 3) The eastern half of N30W430 was shovel scraped to about 20 cm below the plow zone, but nothing was found. 4) Finally, Trench 4 was excavated to a depth of 2 to.3 meters, between N30W430 and N30W420.

The 2 x 4 m trenches (N2W372/374, N0W328/330, N0W310/312, N0W294/296) which ran parallel to Transect E were treated in a similar fashion (see Figure 19). The duff and the upper few centimeters of the plow zone were removed with the backhoe. The remainder of the plow zone, called Level 1, was removed by shovel and then screened. 2) An additional 20-cm level was excavated in the B horizon below the plow zone in N2W374, as was the top of the B horizon in a quarter of N0W330. This 1 x 1 m unit was then taken down about 1 m to obtain information on the stratigraphic sequence which underlies this ridge.

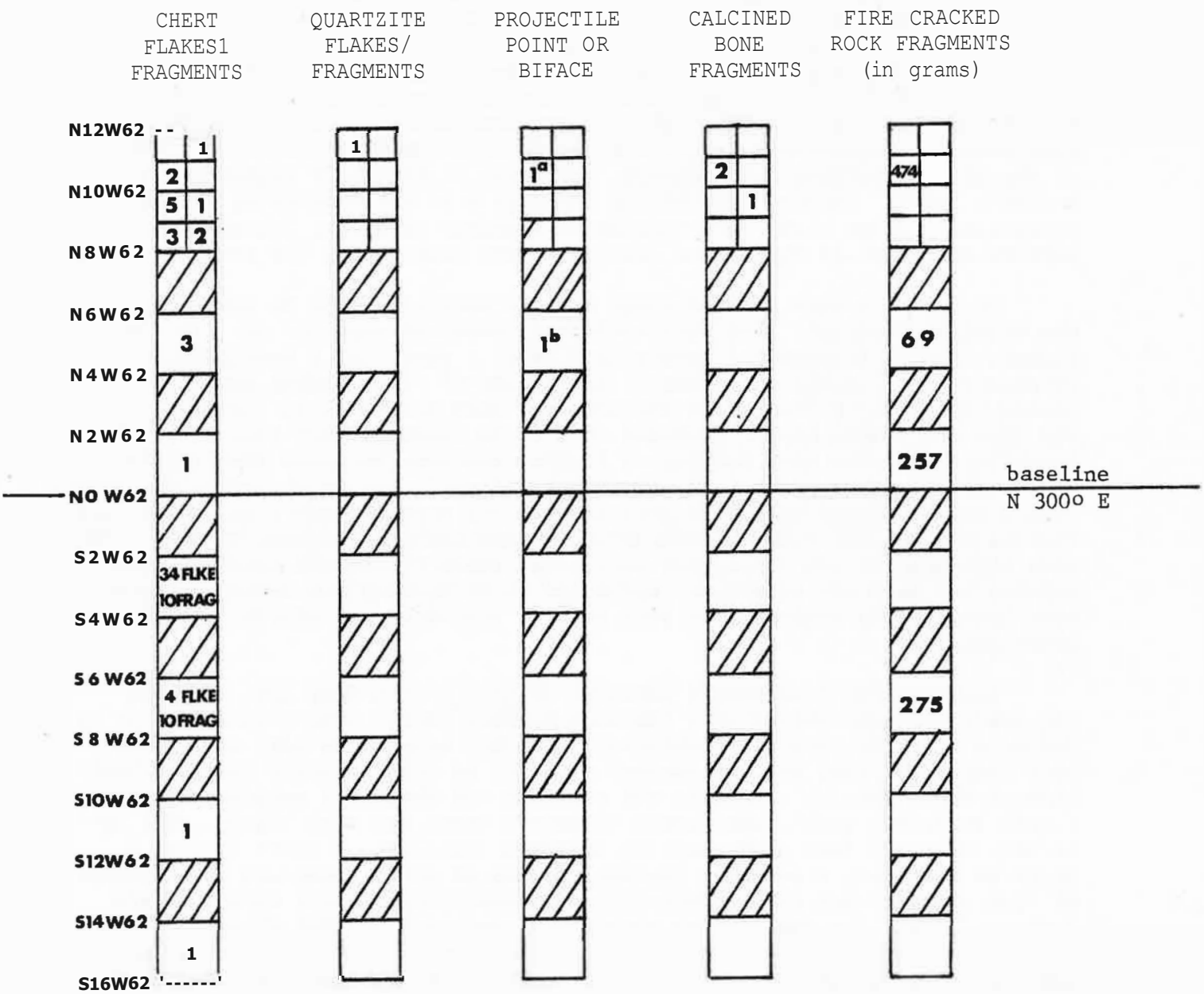
Sampling Results and Interpretations

The interpretive potential of the cultural data recovered in Area A is limited. Site integrity and the clarity of distributional patterns of artifacts have been compromised because all artifacts were recovered in a plow zone context. Thus, some horizontal displacement of artifacts and the destruction of shallow features can be expected to have occurred from heavy nineteenth-century usage of this flood plain. No cultural features, such as hearths or storage pits, were identified, nor were deeper cultural horizons evident in the trench walls. No focal zone of activity was identified. Nonetheless, given what can be reconstructed from the horizontal distribution of positive test pits in Transect A and the artifact distribution derived from Trench 1, it is suggested that this general area of prehistoric activity is roughly 30 x 70 m in size. If so, a 2.5-3% sample has been obtained from Area A. The recovery of a chert Levanna projectile point and what is probably a tang from a Jack's Reef comer-notched point indicate a temporal use of the site by people roughly 1200 years ago, during the Middle Woodland period.

Based on the sample obtained, it is inferred that Area A acted as the site of one, or perhaps several, fairly short-term hunting stations. There is a low density scatter of chert flakes north of the baseline and at the southern end of Trench 1 (see Figure 20). This suggests a low intensity of tool reworking, rather than larger scale point or blade production. Similar activity across Area A would seem to be reflected by the low density of chert flakes recovered during the initial survey from test pits in Transect A. Associated with the few flakes are broken portions of two projectile points. (Preforms were not recovered). The one exception to this pattern is in S4W62, and extending into S8W62, where both a moderate density per 2 x 2 m unit of chert flakes and the presence of chunky fragments of chert suggest the reduction of chert cores as an intermediate stage of tool production. One cortical fragment of chert cobble was also found in N2W62. A single tabular flake was found in S4W62 whose edge has probably been used as a scraper · see Plate I). Limited evidence of cooking is present, as inferred by the recovery of three fragments of burned mammal bone and pieces of fire cracked rock. (Note that in Figure 20 quantities of fire cracked rock are given in grams; actual counts total no more than two rock fragments in any 2 x 2 m unit.) The total prehistoric artifact inventory from Area A, including icems from the initial test pits, consists of: portions of two projectile points, 1 flake scraper, 69 chert flakes, 21 blocky chert fragments, 1 quartzite flake, 3 calcined bone fragments and 6 fire cracked rock fragments.

In summary, the activities carried out by the past occupants of this area appear to have been limited p imarily to tool resharpening, very limited point or blade production (or, at the least, only from nearly finished preforms carried to the site) and cooking. Aside from a single utilized flake, tools such as scrapers, drills, utilized flake blades, hammerstones, ground stone tools, pottery, etc.,which would reflect a broader range of activities were not encountered. However, a note of caution is warranted. During the initial survey, chert flakes were found eroding from the river bank. Because the extent of erosion since the time of site occupation (ca. 1200 years) is unknown, it may be that what remains of Area A is J?eripheral to what was once a much larger and artifactually denser site.

As with Area A, the interpretive potential of Area C (see Figurel9) is limited due to the plowzone context of all artifacts recovered. No cultural features were identified; no deeply buried cultural horizon was recognized. Tht! lade. of a ut!ep arl;haeological component can be particularly rule6 out here, because channel bar gravels and sands were encountered at less than a meter below the surface. Based on the initial test pit survey (from Transect C) and the results of backhoe trenching, archaeological materials are presently contained within an area measuring roughly 12 x 75 m. Thus, sample size is approximately 2.6%. Given the ongoing slurnpage along the adjacent river bank and the likelihood of past flood scouring along the south side of this topographic ridge, however, it is likely that part of this site's surface area has been lost; the extent of lass is unknown. Temporally diagnostic artifacts were not recovered. However, considering 1) the shallowness of the artifacts in this alluvial environment, which suggests a fairly young age; 2) the close proximity of this area to the present channel which was established only within the past 4000 years (see geomorphology section of this report); and 3) the presence of very similar cherts in Areas C, A and D, with cultural deposits in the latter two zones dating from the Middle Woodland period, it is inferred that the artifacts recovered from Area C remain from a roughly contemporaneous occupation dating to approximatelyl000-1200 years ago.



[a]Levanna chert triangular point

[b]Tang of a jasper point; possibly Jack's Reef corner-notched

Figure 20. Artifact Distributions by Categories, Tract 1, Trench 1.

As can be seen in Figure 21, the range and density of cultural artifacts encountered in Trench 3 is limited. Although the quantities of flakes per 1 x 1 or 2 x 2 m unit are higher than in Trench 1, Area A, such small increases are unlikely to represent any meaningful differences in site function. Rather, the reworking of only a few preforms--an activity inferred from the presence of four biface ragments (see Plate I)-- could account for the quantitative differences. (We will see later, for example, that in workshops where stone tools were being made from cobbles, over a thousand flakes were recovered in a single 2x2 m unit.) Cooking, or at least the use of camp fires for warmth, is implied by the presence of fire cracked rock from former hearths. The results of the phosphate tests (see previous section for methodological discussions) derived from 21 soil samples taken from a 3-m interval transect down the long axis of Area C also suggest that food preparation activities were limited in this immediate vicinity. Only one of the 21 samples(that from N66W339, just east of Trench 3) registered at a readable level. Because substantial readings were obtained using the same procedu.res at other sites with similar soil characteristics, organic remains, particularly bone,in Area Care likely to have beenof very low density.

In brief, a very limited range of past activities can be inferred from the existing evidence. The total artifact inventory consists of: 195 chert flakes; 1 chert fragment; 4 quartzite flakes; 3 chert and 1 quartzite biface fragments and slightly in excess of 135 pieces of fire cracked rock. Recognizing that a major portion of the site may have been lost due to erosion, and thus the sample may be a biased one, it is inferred that Area C was the location of an open air, hunting or fishing station, occupied sometime during the Middle Woodland period, by one or several small groups of people who undertook a very limitied number of activities. (Of course, before we jump to the conclusion that the life of this site's inhabitants was simple, we must recognize that many of the day-to-day activities which people are likely to have carried out here are simply not reflected in archaeological deposits which have been heavily disturbed by both natural processes and modern agricultural practices.)

Based on the preliminary sampling of Area D with nine test pits and the additional excavation of a 16m-long backhoe trench (see Figure 19), it is inferred that the level of prehistoric activity undertaken here was either very limited or that the artifactual evidence of such activity has been lost through flood erosion. Because the plowzone (in which nll rtif cts were found) is fairly thick, the former inference seems the more likely. The artifact inventory from both sampling episodes includes: 7 chert flakes, 1 piece of clay pot, 3 calcined (burned) pieces of mammal bone and 22 fragments of fire cracked rock (see Figure 22). Temporally diagnostic artifacts are lacking, except for one pottery sherd which suggests a Middle-Late Woodland period occupancy. The refurbishing of a few stone tools and the cooking of captured game may be inferred from the flakes, pottery, bone and heat-fractured rocks which are present, or at least this is true for the area immediately surrounding Trench 4. Little more can be said about peoples' activities in this portion of Tract 1.

Once Areas A,C and D had been sampled,attention shifted to determining the archaeological sensitivity of two ridges which run in an arc across the middle of Tract 1. These ridges form part of a levee and swale s quence which

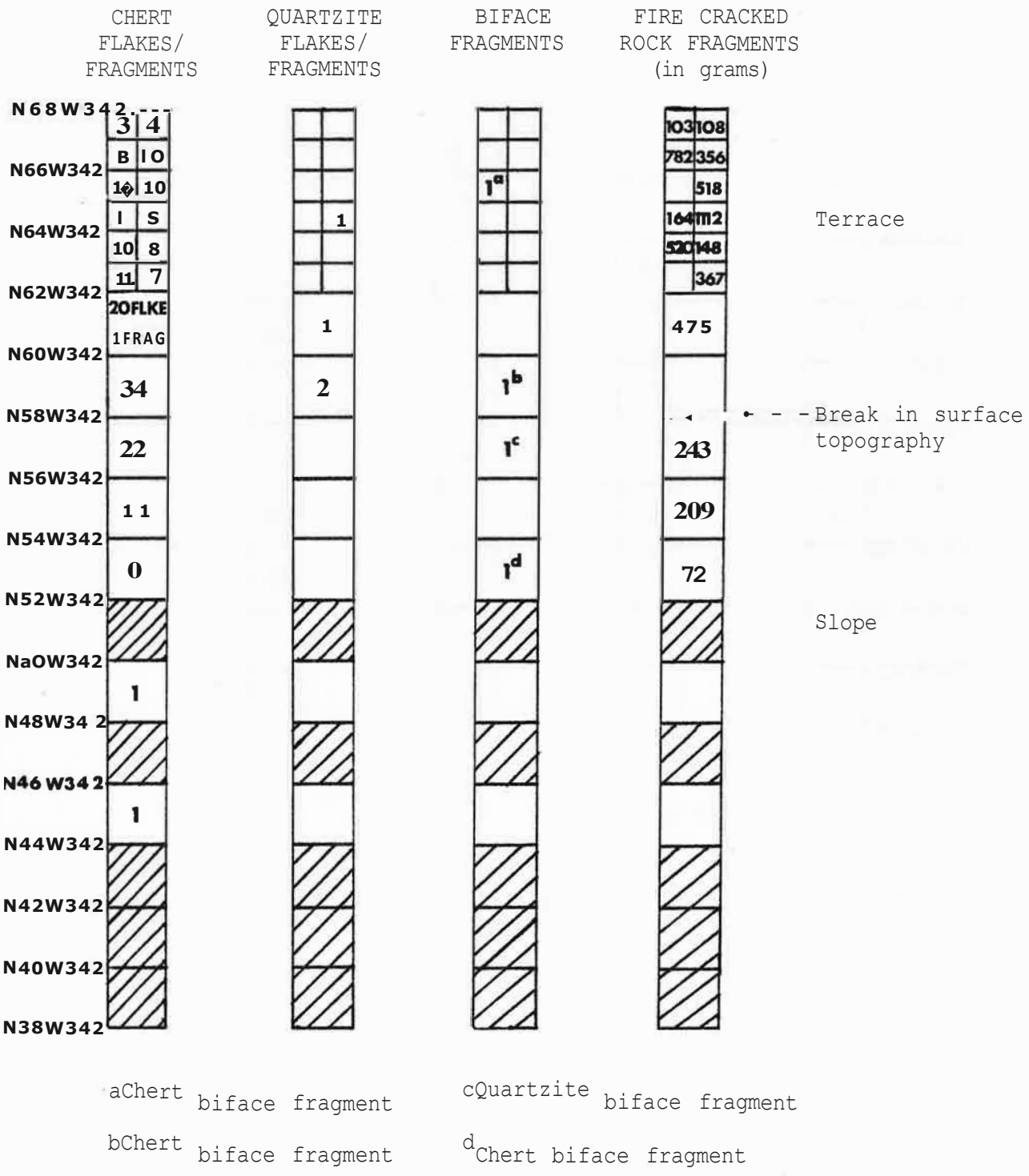
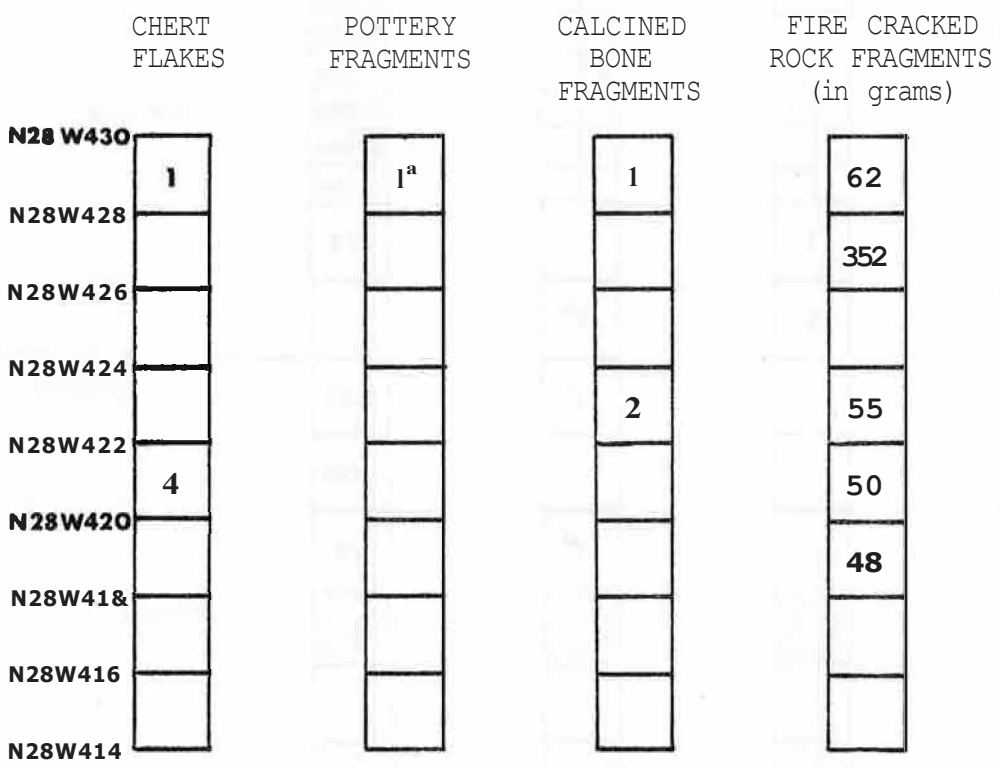


Figure 21. Artifact Distributions by Categories, Tract 1, Trench 3.



[a] undecorated body sherd

Figure 22. Artifact Distributions by Catee;ories, Tract 1, 'l:rench 4.

developed as a former Missisquoi River channel moved laterally to the south prior to ca. 5000 B.P., forming this flood plain in the process. See Figure 9 for a visual interpretation.

Part of one ridge had been minimally checked with four test pits during the preliminary survey (Transect E in Figure 19), but no prehistoric artifacts were recovered. Four 2x4m units, situated on high points across this ridge and running parallel to Transect E, were sampled in order to confirm the initial results. Nine chert flakes were found in N2W374; one quartzite flake and three pieces of fire cracked rock were retrieved from NO W330. All items were located within a nineteenth -twentieth century plow zone. Four soil samples, two from S2W294 and two from S2W310, were tested for their phosphate content. The results showed phosphate levels from 2 to 3 times the normal background reading present in other test units where prehistoric items were found.

This is the one sampled subarea within Tract 1 where it is nearly impossible to draw meaningful conclusions about what the artifactual data might represent. Unlike previous areas where extended trenches helped to provide a picture of the horizontal patterning of artifact scatters, information here is provided only by the contents of two 2x4m pits which are separated from one another by 40 meters. The following can be said. First, some sort of stone tool resharpening or manufacturing was carried out on this ridge. Second, given the negative results from the four test pits in Transect E which lie 10m south of N2W374, such activity may be fairly localized. Third.any evidence of past activities in this vicinity is likely to exist in a disturbed plowzone context. Several culturally critical questions, however, are unresolved. First, because this ridge is a relatively ancient land form and is over 100m from the present channel,is it possible that archaeological deposits here are considerably earlier than 1000-1200 years ago? Second, if this is an older site locale are different types of artifacts present which might reflect a changing or unchanging use of this portion of the river over time? Only an expanded sample could provide the answers.

The high phosphate readings in the soil samples from S2W294 and S2W310 are very likely to have resulted from nineteenth-century activity. A few pieces of window and bottle glass, brick fragments, nails, a bone and a plastic button, part of an insulator, coalcinders and pieces of historic pottery (mostly stoneware and whiteware) were found scattered in small quantities randomly within the plowzone across Tract 1 in Trenches 1, 3, 4 and N2W372, as well as in the initial test pits. Periodic flood redeposition may account for all items. The density and variety of historic items increased in NOW330, however, and substantially so in S2W294 and S2W310, The inventory from these three pits includes: small pieces of sa m boards, 2 bolts, 36 brick fragments, a 22-caliber shell case, a glass button, a piece of coal, a piece of concrete, a whetstone, 15 pieces of window or bottle glass, 14 pieces of whiteware, part of a bucket, a grommet from a shoe, a brass drawpull, 389 square cut nails, 9 wire nails, 15 clay pipe fragments, 10 screws and a piece of textile. Although much of this material looks like

structural debris, no depression or foundation remnants are visually apparent in this immediate area. Other items would seem to represent domestic garbage, but the location of a house in Tract 1 is unconfirmed by any 19th or 20th century map consulted during the background study for this project. Furthermore, Tract 1 is poorly suited as a residential site because access is difficult and the terrace is subject to flooding. For these reasons, and taking into consideration the types of artifacts encountered, it is suggested that a post-Civil War- to early twentieth-centurydu p an situated on this ridge. Primary research might actually identify a building site.

"The final phase of testing in Tract 1 was conducted along the southernmost ridge to determine whether or not archaeological deposits could be found which relate to this old landscape feature. Transects F and G, employing 50cm test pits at 8m intervals, covered a distance of 176m along the highest portion of this ridge (see Figure 19). No evidence of prehistoric activity was recovered; historic debris was minimal, including only 1 brick fragment, 2 pieces of window glass, 2 pieces of whiteware and 6 square cut nails.

General Inferences and Conclusions

With the exception of a poorly defined area surrounding N2W374 and NOW33 where chert and quartzite flakes were recovered, prehistoric activity within Tract 1 has apparently focused along the current river's edge. The few temporally diagnostic artifacts which were recovered indicate Middle and possibly Late Woodland periods of occupation, while the limited range and low frequencies of all artifact classes suggest a sequence of brief stays by small groups of people. Given the size of the surface area which was partially sampled near the river in Tract 1 (ca. 3,000m^2) and an equally large surface area which has probably been lost to erosion, at least twenty-five evenly spaced, small-group hunting camps could have been occupied along the river without any spatial overlap at all. Thus, the large amount of suitable space for residential sites within this broad flood plain may partially account for the lack of dense cultural deposits produced from temporally sequential, but spatially overlapping residential sites.

Subsistence strategies apparently focused on hunting as suggested by the projectile points and a few pieces of burned bone derived from medium-to-large-sized mammals. Fishing and the gathering of plant foods may also have been commonly practiced, but the absence of cultural features, particularly cooking hearths or refuse pits, makes it impossible to evaluate this hypothesis.

One last general observation seems appropriate. Although now in pasture, Tract 1 was undoubtedly covered with trees in the past. Because the only open exposure for sites located along the river would have been to the north, it seems unlikely that such sites would have been occupied during late fall, winter or early spring when south and southwest facing spots would have provided much better solar exposure for warmth. Thus, use of such sites between late April and early October seems probable, but there is currently no way to test this notion of seasonality.

Based on the artifactual and spatial evidence of past occupations (in conjunction with what can be inferred from sites located upstream in the project area), the type of small site identified with Tract 1 is likely to represent a significant subset of Middle Woodland period residential sites. If an understanding is to be gained of how past societies used such sites, both seasonally and functionally, it will be necessary to explore several of these sites in detail. Estimates need to be developed of the size of the hunting and/or residential groups who used this portion of the Missisquoi Valley, of their length of stay, of the season(s) of site use and of the full range of activities people were undertaking. Better temporal controls, derived from a sequence of radiocarbon dates, are also needed before models of Middle Woodland settlement systems can be adequately evaluated.

Given the results of the site evaluation for VT-FR-103, it is unlikely that such estimates can be derived from further study within Tract 1. All artifacts were recovered in a plowzone context.Deeply buried cultural deposits were not identified. The few organic remains which were recovered are poorly preserved. Cultural features are lacking, or more probably, have been destroyed by repeated plowing. Recurrent bank erosion along the river has certainly destroyed some of the archaeological evidence, and periodic flood scouring may have adversely affected distributional patterns away from the river. Thus, limited site integrity wouldconsiderably restrict further interpretation. Although additional study is not recommended, it should be noted that the information which was gained from the two phases of site evaluation does offer an important, if limited, comparative data base for defining the contrasts and similarities between sites here and those Middle **Woodland** sites identified upstream.

SITE EVALUATION FOR TRACT 4 or VT-FR-104

Background: Reconnaissance Phase Sampling Results

This site was originally located during the course of testing Highgate Falls Tract 4 (see Figures 4 and 23). It is situated on an alluvial terrace immediately adjacent to the south bank of the Missisquoi River. The surface elevation is 180-182 feet msl, or 5-6m above the river. Small tributaries form the eastern and western boundaries of this terrace. Bedrock outcrops in the river channel a short distance to the northwest of the western tributary, thus marking one of a number of small rapids which occur along this section of the river.

Cultural debris, including 2 quartzite flakes, 1 chert flake and 1 fire cracked rock, was recovered from the undisturbed stratigraphy of this site. The typical stratigraphic sequence includes: the A horizon of brown silt loam from Oto about 10 cm below surface underlain directly by the B horizon of light brown silt loam in several cases and underlain, in turn, by the C horizon of grey-brown sandy silt loam. In other cases, however, the A horizon is underlain by a light grey silt loam with associated orange mottles beneath which lie the unmodified Band C horizons. Cultural debris is present towards the bottom of the A horizon and in the upper portion of the B horizon, between depths of 5 and 20 cm.

No estimate of the site's age ,was possible due to the lack of temporally diagnostic artifacts. Similarly, estimates of site size or activity areas were not possible due to limited testing. The bounding tributary streams suggested a maximum east-west extent of the site of about 50m.

Site Evaluation Program: 1982

Sampling Scheme

The low alluvial terrace which encompasses VT-FR-104 was surveyed and a 25cm interval contour map was prepared. The map was extended approximately 35m south of the baseline in order to include a higher terrace which was noted during the initial survey, but was not sampled.

Following this preliminary work, subsurface testing was begun. Thirty-three 50cm test pits were excavated (see Figure 24). Test pits were usually spaced at 4m intervals along E-W transects arranged parallel to the baseline. Due to the presence of large hemlock trees, however, some spacing variation between test pits occurred. Alm pit was employed to facilitate the study of a concentration of burned bone encountered in a small test pit.

In order to evaluate the archaeological sensitivity of a meter-higher terrace to the south, thirteen 50cm test pits arranged at -8m intervals along a single transect were excavated (see Figure 24). One of these test pits was expanded to lxlm when prehistoric artifacts were encountered.

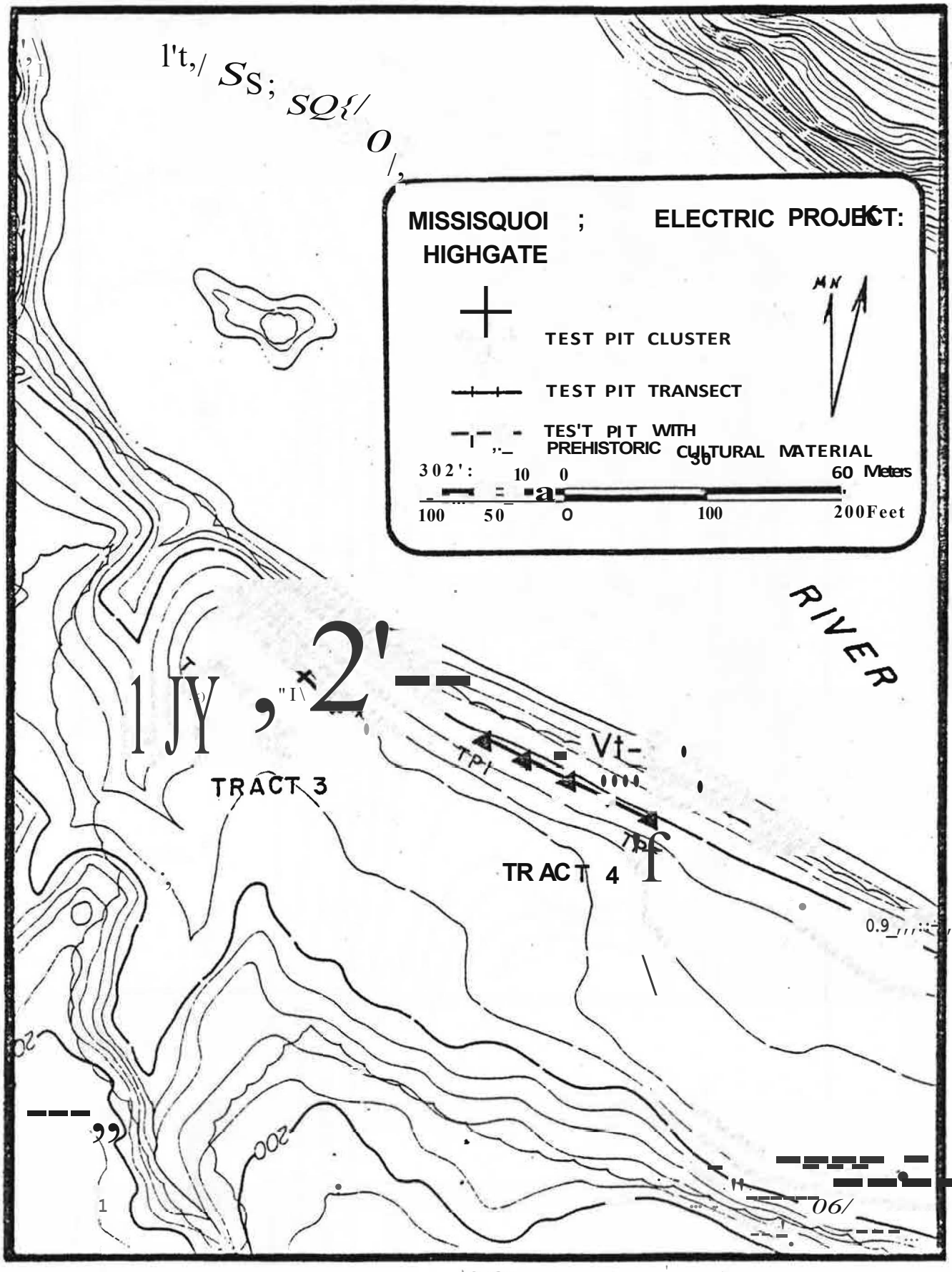


Figure 23. Tracts 3 and 4. t-Fr-104

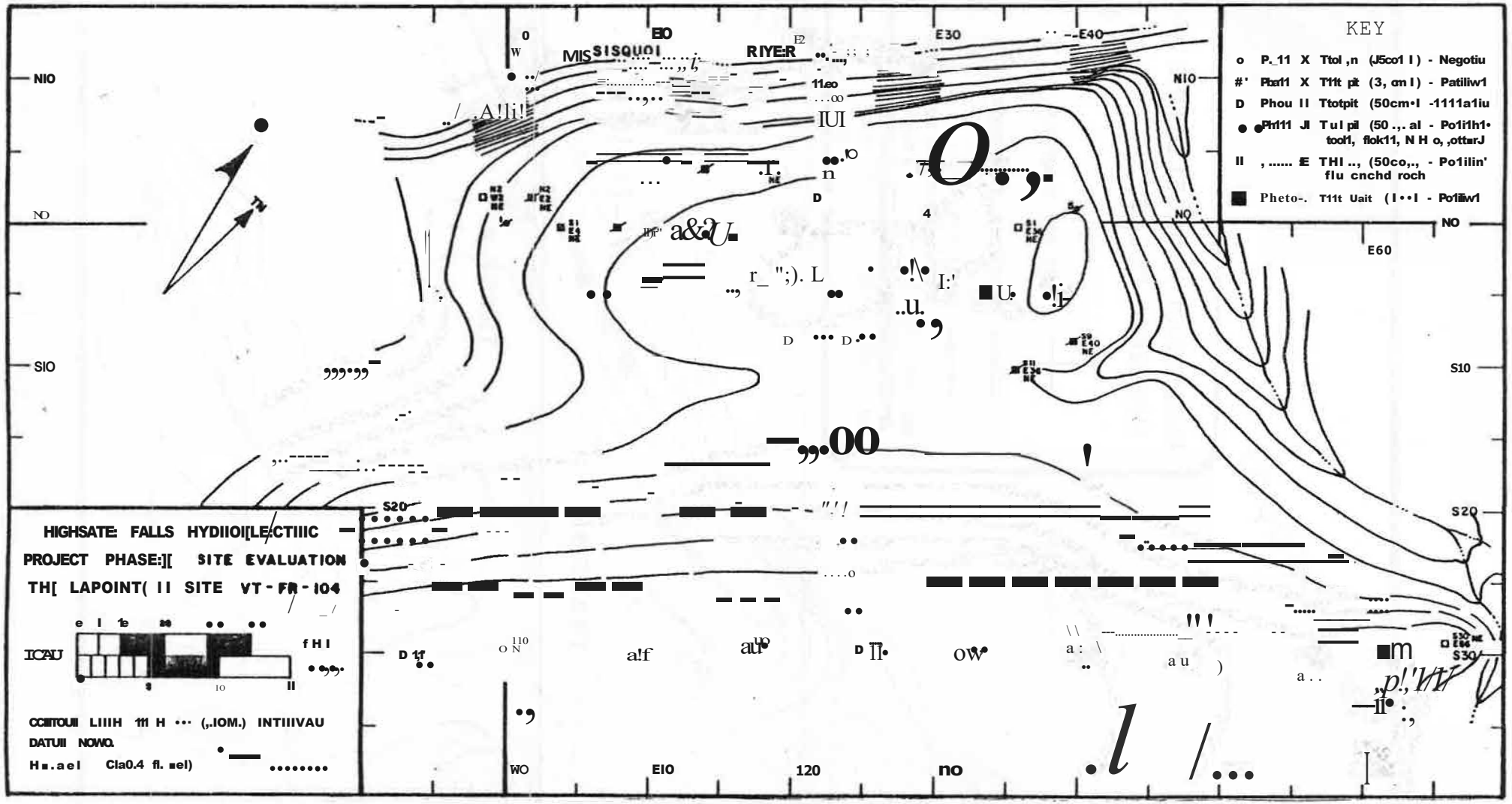


Figure 24. Sampling Locations at VT-FR-104.

Fifty-four soil samples were collected and tested to determine their phosphate content. A total of twenty-two samples were taken from the A and B horizons in eleven 50cm pits; eighteen samples were collected from the 1 x 1 (S6E34) where a concentration of burned bone was found; fourteen samples were taken from test pits on the higher terrace from three test pits where artifacts were recovered. Because this site exhibits a low artifact density, sampling for soil phosphates was conducted primarily to evaluate the usefulness of this method in identifying general areas which might contain organic refuse, particularly bone, yet which might be overlooked if artifact distributions alone were relied upon to identify activity areas within the site.

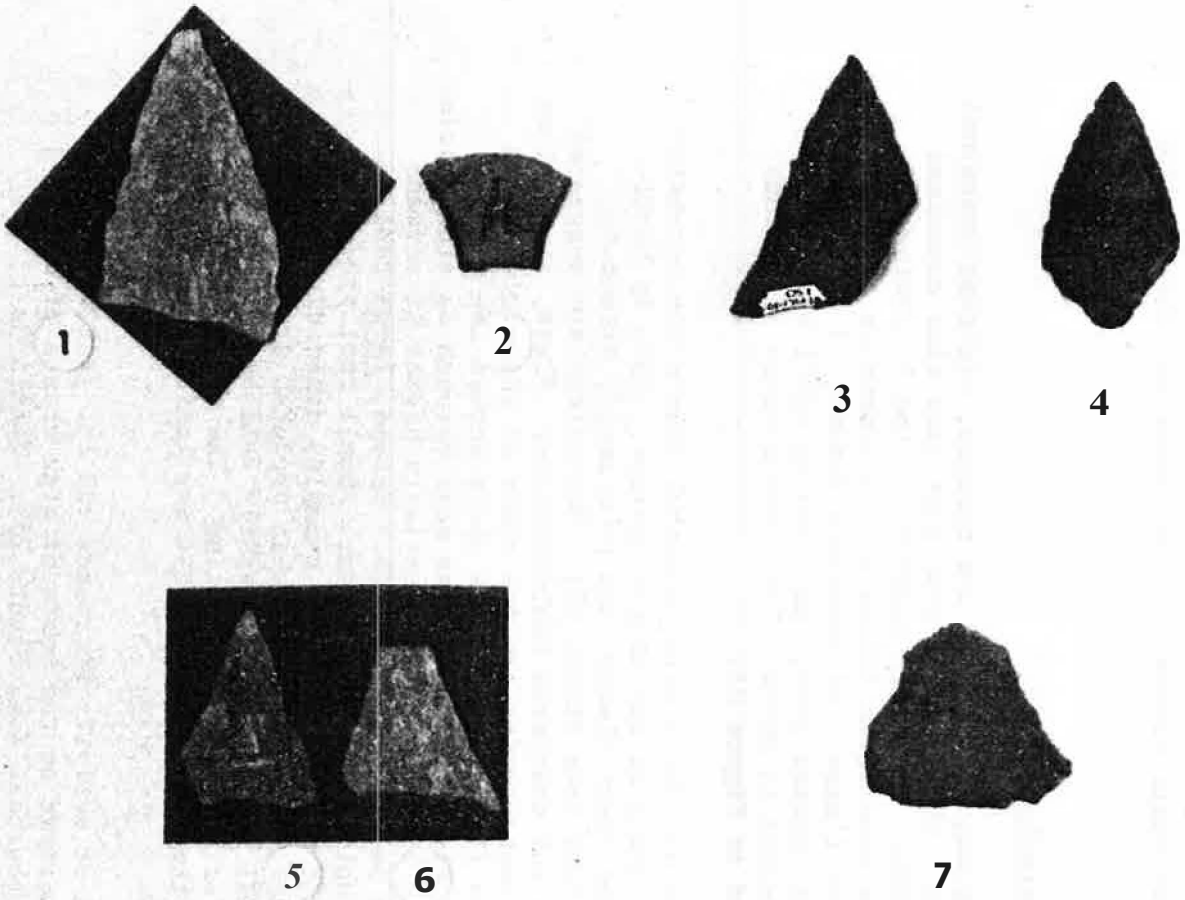
Bulk soil samples were also taken from the 1x1 (S6E34) on the low terrace. These soils were subsequently water screened through 1mm-mesh sieves in the lab in order to recover small pieces of bone, seeds and charcoal for possible C-14 dating.

Sampling Results and Interpretation

Of the thirty-three sampling pits on the low terrace, eighteen contained prehistoric cultural material. Three of the 1980 test pits also contained artifacts. The combined artifact inventory consists of the following: 1 Levanna projectile point made from chert (Plate 1); 1 quartzite scraper; 4 pieces of pottery; 12 chert flakes; 69 quartzite flakes; 3 quartz fragments; 97 pieces of fire cracked rock; and 100s of small p eces of burned bone from a hearth located in S6E34. The distributions of various artifact classes are depicted in Figure 25.

In some respects, so few artifacts were recovered that a low intensity scatter seems to be characteristic of the entire terrace. This is particularly true for quartzite and chert flakes, and to a lesser extent for fragments of fire shattered rock (see Figure 25). Two things are suggested by the very low flake counts and scattered distributions. First, final blade reduction and/or stone tool resharpening are the types of activities which are likely to have left a few flakes at multiple spots across the terrace. Because the vast majority of flakes produced from edge retouch on stone tools are small, flake counts would probably be substantially higher if screens smaller than 3/4" mesh were to be used at VT-FR-104. Second, large tool manufacturing workshops are unlikely to be present. Small tool production areas, however, may exist. At other sites, for example, dense clusters of flakes where projectile points and other tools were produced are only 2-3m in diameter. Thus, such small workshops could easily fall between the 4m-interval test pits used for this site evaluation. The recovery of 27 quartzite flakes in N2E2 or the 15 flakes in N4E14 may indicate that small workshops are located nearby.

The clearest focal area of activity surrounds the 1x1 (S6E34) where a shallow cooking hearth was defined on the basis of high counts of burned bone and limited amounts of charcoal (see Figure 25). Within 3m of the hearth to the northwest, a projectile point and a scraper were recovered in S5E30. Three additional pieces of burned bone (S6E36 and S9E36), 4 pieces of pottery (S9E40), 3 quartzite flakes (S4E30, S8E28, S9E40) and a chert flake (S9E40) were also found within 8m of the hearth. Based on this limited

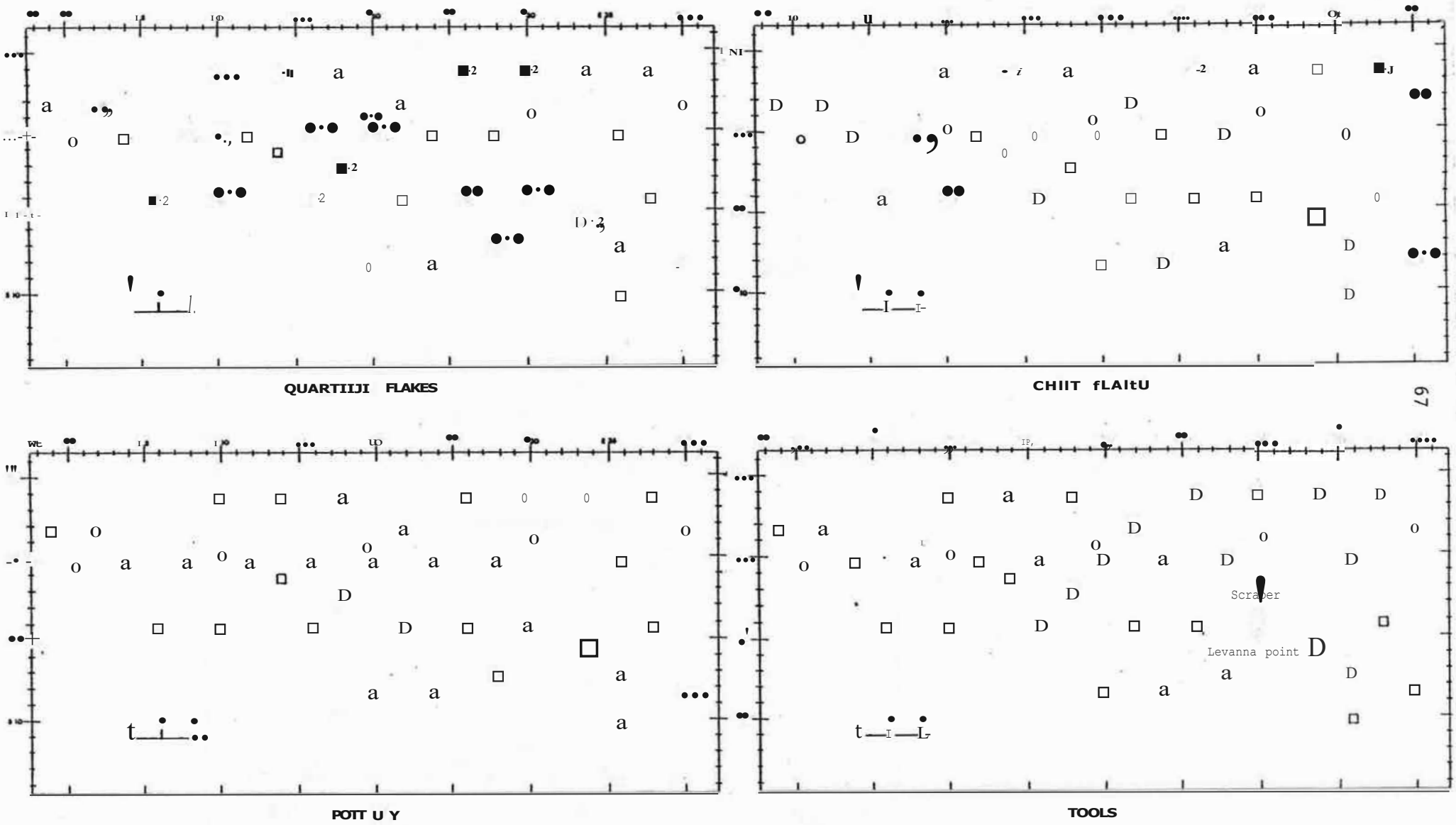


VT-Fr-103, 104,139,153

0 1 2 3

Plate I

1. Qu."1rtdte point tip (1ll95): V1'-l'R-103, N58W342.
2. Chert flake scraper (UI29--l): V'l'-FR-1(13, S4W62.
3. Chert Lev-anna point (U150): VT-f'R-104, SSE]O.
4. Chert stemmed p,:iint (#174}: VT··-FR-104, S3IE62..
5. **Quartzite Levanna point (#104): VT-FR-139, surface, east section.**
6. Quartdte Levanna point (#108): V'l'—FR-139, surface, east section,
7. Chert corner-notched point (11101): V'f-FR-153, river bank.



O 1980 35 cm² test pit - negative
e 1930 35 c..,l test pit - positive
0 1982 35 cm² test pit - negative
■ 198₂ SO cm² test pit - positive

Figure 25. Artifact Distributions at VT-FR-104.

cont.

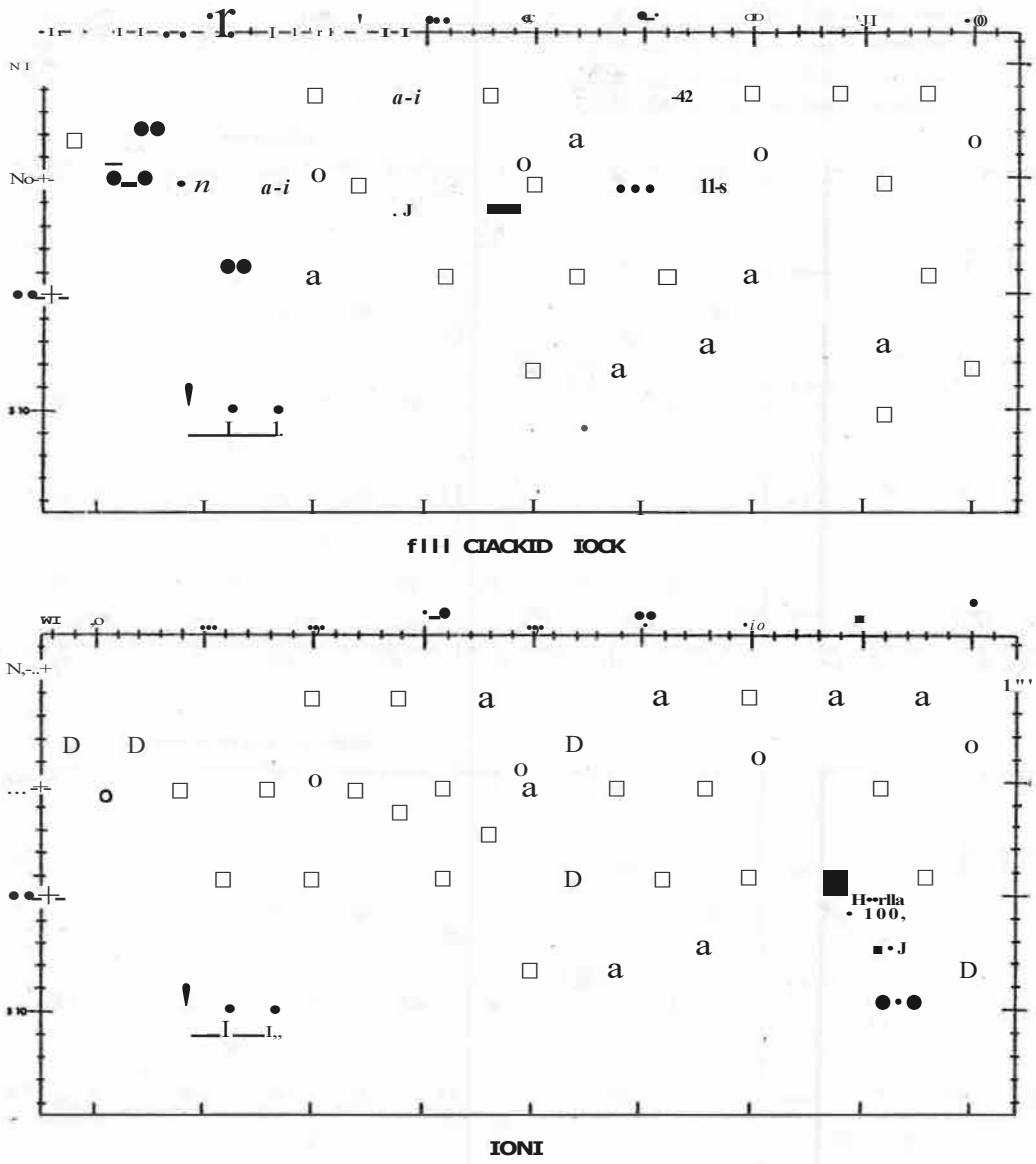


Figure 25, continued. Artifact Distributions at VT-FR-104.

distribution, it is hypothesized that a roughly 16 x 10m portion of the terrace surrounding S6E34 represents a focused zone where a variety of tool preparation, processing and cooking activities were undertaken. Better definition of most of these activities is impossible at this time, however, because too limited a sample has been obtained.

Both the vertical and horizontal outlines of the hearth in S6E34 were very poorly defined, but it was probably less than a meter in diameter. The outlines may have been obscured by heavy root disturbance which is common. It may also be true that if the hearth was shallow and used for only a brief period that little visible evidence remained even a short time after abandonITent. Although the dimensions of the hearth cannot be reconstructed, the burned bone found within the hearth does provide additional information about site function.

Nearly all of the identifiable bone fragments (n= 40) are derived from the lower front and hind legs of a deer. Carpal and tarsal bones are present, as are small pieces of metacarpals and metatarsals. Most common are the proximal and distal ends of the first, second and third phalanges (the toe bones). A full inventory is provided in Figure 26. The only bone which is not from the lower leg is part of the auditory canal from the skull. Because there are no identifiable duplicate bones, it seems probable that only one deer is represented. On the basis of the small size of the carpals and phalanges (and recognizing that burning does cause bone to shrink), it is also likely that this is a young individual. If the comparative skeleton used for this study has been accurately aged at 6 months, the deer brought to VT-FR-104 was about the same age. This would suggest a September-November kill for the deer, as well as a fall period of occupation for this site.

On the higher terrace, three adjacent test pits (S31E62, S34E60, S38E60) contained evidence of prehistoric activity (see Figure 24). A 1.5m2 sample resulted in the recovery of a small, stemmed projectile point made from chert (Plate 1), 1 chert flake, 1 jasper flake and 23 quartzite flakes. Little interpretation is possible, but it is clear that the stennned point is not temporally related to the Middle Woodland period use of the lower terrace. The style of the point cannot be classified based on the recognized typology of Northeastern projectile point forms, but its general shape suggests a Late Archaic period association of about 2500 B.C. If this interpretation is correct, it is likely to be the only site identified in the Highgate Falls Prehistoric Archaeological District which dates to this specific time period,

General Inferences and Conclusions

The preliminary results of the site evaluation study conducted on the low terrace point to several conclusions. First, the period of site occupation is likely to be post-A.D. 900. This is inferred from the presence of a Levanna-type projectile point and by the decorative technique used on one piece of pottery where some type of perishable, possibly a woven fabric, was used to create an impression on the exterior surface. Second, various

Testing Area/ Sampling Unit	Catalog No.	Species	Bone Description
S6E34NE	163-2	Deer	4 metatarsal £rags; 1st phalange £rag
S6E34NE	166-1	Probably deer (very young)	Metacarpus, proximal end; 2 carpals; auditory canal; other £rags
S6E34NE	166-2	Probably deer	Metacarpal £rag
S6E34NW	162-2	Deer	4 phalange £rags
S6E34NW	167-1	Deer	Lower leg(s); phalange £rags; sesamoids; metacarpal; carpal
S6E34SE	160-3	Deer	1st, 2nd, 3rd phalange £rags; metatarsal frag (small individual); possible humerus, distal epiphysis £rag
S6E34SE	160-4	Deer	Metapodial, distal end; terminal phalange
S6E34SE	168-1	Deer, very young	Sesamoid; tarsal; terminal phalange
S6E34SW	161-2	Deer	1st phalange
S6E34SW	165	Deer	Metatarsus, medial segment; Metapodial, distal and proximal end
S6E34SW	169-1	Deer	Phalange; 2nd phalange; sesamoid

Figure 26. Identified Bone from a Hearth at VT-FR-104

activities were carried out across the entire terrace by the site's inhabitants, but, as yet, specific activities are poorly defined. Third, one or more occupations may be involved, but at least one area of focused activity seems to exist around a small hearth in S6E34 and may represent a single episode of site use. Fourth, the very limited range of tools recovered--one roken projectile point and a single scraper--suggest that this terrace encompasses one or more hunting camps. Fifth, the length of residency at such a camp was probably brief. Artifact densities are low and of the forty-two soil phosphate tests which were run, only five samples contained sufficient phosphate to produce measurable but very low (tint to weak-) readings. Three of the five samples came from the general hearth area (S6E34, S9E40, S11E36); the other two were scattered (N5E10 and N5E38). When compared with the high frequency of positive samples obtained from an artifactually dense site such as VT-FR-134, these results suggest that at VT-FR-104 past occupations have been too short to create deposits of organic refuse.

From a comparative standpoint, the low densities and limited range of tools recovered on the alluvial terrace at VT-FR-104 are very similar to those encountered downstream within the larger tract of land along the river at VT-FR-103. (The only apparent reason why artifact counts from VT-FR-103 are higher is that much larger areas were sampled.) Although far less is known about the contents of VT-FR-105, 106 or 130 (identified during the 1980 survey) or of VT-FR-151, 152 or 153 (to be discussed in the next section of this report), all of these sites are situated on low terraces, along the south side of the river, and within a few hnndred meters upstream or downstream from VT-FR-104. Based on current temporal and geomorphological data, each of these sites appears to have been used sometime between approximately 1200 and 750 years ago. A series of radiocarbon dates would be extremely useful, however, for confirming this impression.

What is important to recognize is that within the Highgate Falls Prehistoric Archaeological District these sites make up a significant functional class of Middle-early Late Woodland period.sites. As such, they form an integral part of the settlement system employed by communities of people who used the MissisquoiValley during these centuries in their pursuit of food and other resources. Although highly unimpressive if one's goal is to excavate such sites to collect artifacts for display in museums, sites of this type, which are so frequently encountered along this portion of the river, must be thoroughly studied before an adequate understanding can be reached of the functional and seasonal role they played in peoples' lives. How often did parties exploit thts segment of the valley and how large were the groups involved? Why were they here? When were they here and what activities did they undertake? Controlled studies of such sites as VT-FR-104 may allow archaeologists to reconstruct a part, but a significant part, of the Middle-early Late Woodland settlement pattern employed by residents of the Missisquoi watershed, and, by inference, to develop testable models of commnnity life in other major watersheds in the Champlain Basin.

Because the cultural deposits at VT-FR-104 are shallow because any disruption of the distributional patterns of artifacts has been minimal, and because mapping and preliminary analyses have already been completed, detailed data recovery could be easily carried out in a roughly 16 x 10m focal activity area surrounding the hearth in S6E34. Such work could

certainly help to answer several of the questions enumerated above. For these reasons, and in order to develop the comparative data needed to interpret other Middle-Late Woodland period sites along the river, it is important to obtain an extended sample from at least this locale before it and numerous others like it are inundated.

Limited data recovery on the higher terrace also is warranted, especially since this site is temporally and physiographically unique in the present sample of sites identified within the District. Artifacts are buried at depths of less than 20 cm, and, although natural processes have caused some vertical disruption, the site has as good integrity as is likely to be encountered in any forested area. For these reasons, sampling should be concentrated in a 4 x 10 m zone between S31E62 and S38E60 to determine whether features or other classes of artifacts are present. If features are found, a detailed analysis should follow.

PRELIMINARY RESULTS FROM VT-FR-151, 152 and 153

During the period when site evaluations were being conducted at VT-FR-103 and 104, it was noticed that fluctuating water levels were causing considerable slumpage along the river bank, particularly along the narrow alluvial terrace between Tracts 3 and 8 (see Figure 27). It seemed likely that prehistoric artifacts or features might be exposed by such slumpage. If such cultural items could be identified, additional information could be quickly gained about site distributions along a terrace which is already known to contain VT-FR-104, 105 and 106. Brief surveys were conducted by the Project Director and the Assistant Archaeologist. Two sites were located.

VT-FR-152

This site is located approximately 50m upstream from the eastern limit of VT-FR-104 and is situated on the same alluvial terrace at about 180 ft.m.s.l. It was identified n the basis of 12 chert flakes found eroding from the bank. Six 50cm, test pits were subsequently excavated. They were arranged about 4m from the edge of the bank and parallel to it. Two quartzite flakes (Test Pit 2), one quartz flake (Test Pit 3), one chert flake and a fragment of fire cracked rock (Test Pit 5) were recovered. The artifacts were found in what appear to be fairly underdeveloped flood sediments, but little stratigraphic detail was collected. There is still an appreciable portion of terrace running parallel to the river, and, given the frequency with which sites seem to occur in this vicinity, additional archaeological deposits and artifacts are likely to be present. Based on the field observations, however, it is also likely that portions of this terrace have been and will continue to be, lost due to erosion.

VT-FR-153

This site.is located on the same terrace as VT-FR-152, about 48m upstream. It was identified on the basis of a single projectile point fragment anchored in the river bank (see Plate I). The point is not complete enough to easily define its type, but it is apparently some variety of comer-notched point. Given the Middle-Late Woodland period temporal range which is presumed for other sites on this terrace, this point would fall comfortably into the Middle Woodland class of Jack's Reef comer-notched points, which were in use about A.D. 500-800.

The root IIL;ltand adhering soil along the bank was cut and screened; two 50 x 50 cm test pits were dug on the terrace edge within 2-3 meters of the point. No additional artifacts were found.

Although sampling was too limited to evaluate the integrity of this portion of terrace, it was noticed that broad erosional scouring created a depression on the back side of the generally level terrace surface. In fact, only about 5 meters of level terrace exists between this depression and the slumping river bank. In this specific location, therefore, the loss of archaeological data may have been even more pronounced than in adjacent sites.

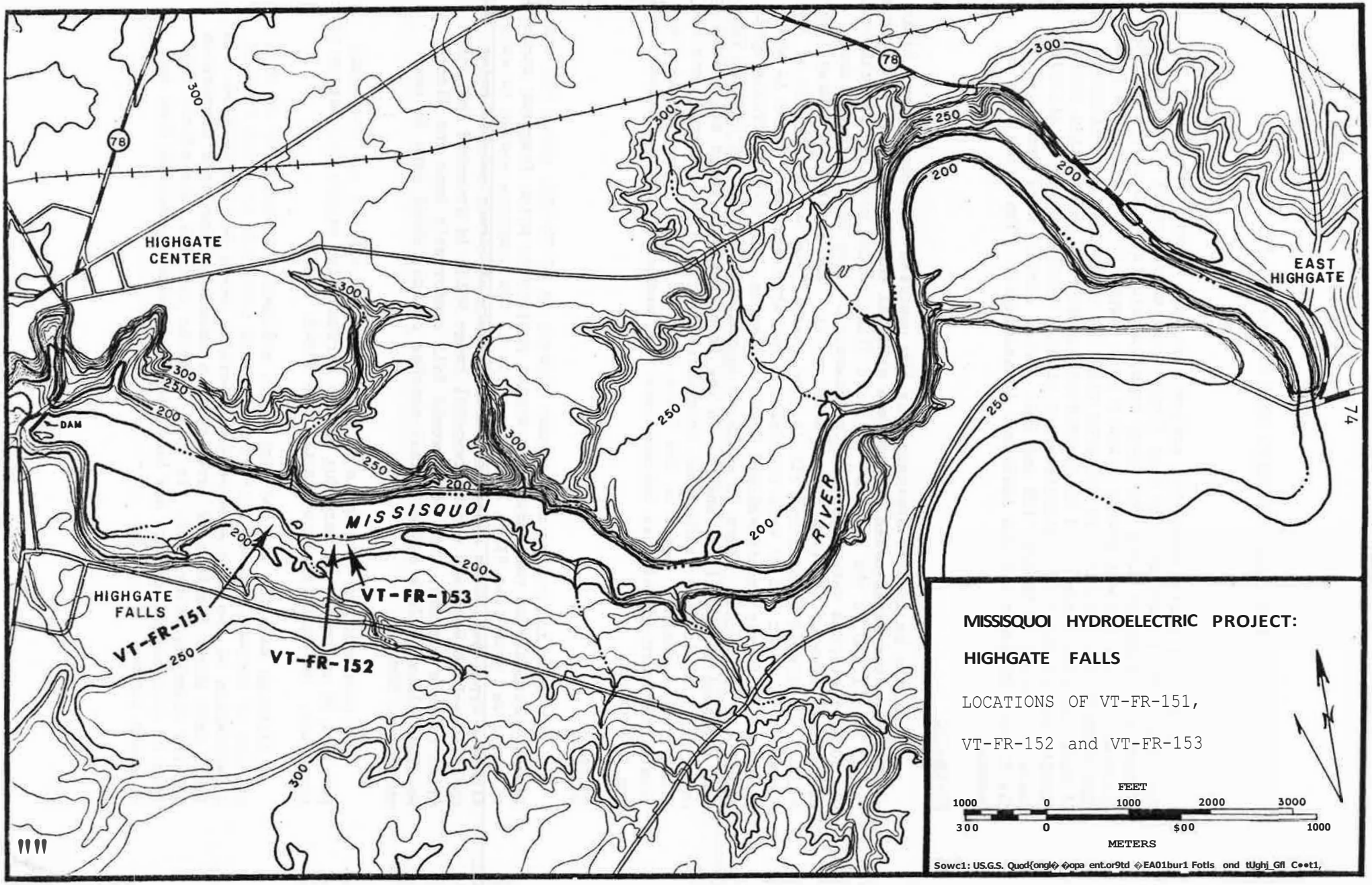

HIGHGATE CENTER
EAST HIGHGATE
HIGHGATE FALLS
DAM
MISSISQUOI
RIVER
VT-FR-151
VT-FR-152
VT-FR-153
78
74
300
250
200
MISSISQUOI HYDROELECTRIC PROJECT:
HIGHGATE FALLS
LOCATIONS OF VT-FR-151,
VT-FR-152 and VT-FR-153
FEET
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Figure 27.

VT-FR-151

During the final day of fieldwork, three people spent about three hours obtaining a small comparative sample from a portion of level.terrace located about 185m downstream from VT-FR-104. Rather than facing north (as do VT-FR-104, 105,106, 152 and 153), this terrace faces east and allows an excellent view of the river for at least a mile upstream. It was surmised that if long-distance visibility provided any advantage to a site's occupants then this location might contain increased quantities of prehistoric artifacts. If so, any tools which could be recovered might provide further temporal information.

Of five 50cm test pits.which.were aligned across the most level area of the terrace, only one was positive. Test pit #3 was expanded to a 100x50 cm unit. It contained 2 quartz flakes, 1 chert flake, 62 fragments (2.7 kg.) of fire shattered rock and 6 small pieces of burned mammal bone which could not be identified. No doubt, at least part of a hearth was encountered, but before further evaluation could be completed, one, of the crew members was stung by a bee. Her teammates took her to the doctor and there was insufficient time once they returned to do anything but fill the test pits before leaving for Burlington.

One characteristic of this terrace only becomes apparent after crashing around in the dense undergrowth which covers it. The edges of the terrace have a fairly gentle slope, rather than a steep slope as is common in upstream areas. This relative gentleness has probably been caused by large blocks of ice being forced up and over this terrace during spring floods. Only surface areas which sit back from the terrace margin have escaped such modification. It is concluded therefore, that most of this terrace lacks integrity. For this reason, except for the area around the hearth in Test Pit #3, there appears to be little chance of finding intact remains of prehistoric occupati_o.ns..

SITE EVALUATION FOR TRACT 28 or VT-FR-140

Background: Reconnaissance Phase Sampling Results

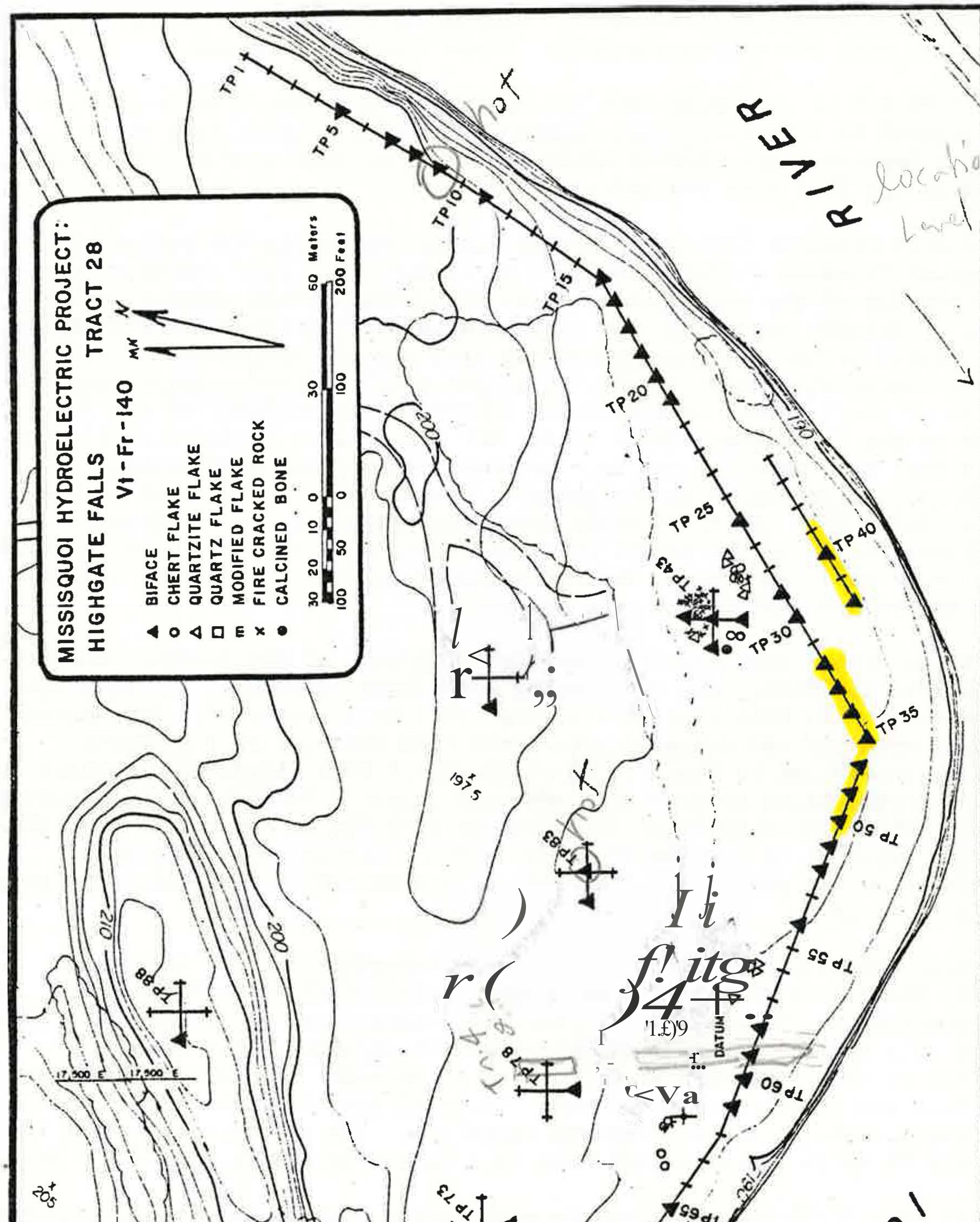
VT-FR-140 designates the whole of Tract 28, a large flood plain area of which approximately 12.6 acres will be subject to direct inundation by the proposed power pool. Ninety-seven test pits, oriented in ten sampling units, were excavated along various microtopographic features within the tract (see Figure 28). Forty-seven test units (48%) out of this total sample produced subsurface evidence of prehistoric activity. In addition, limited surface collection in three partially disturbed localities in the middle portion of the tract yielded 139 prehistoric artifacts. Cultural material was found in virtually all tested areas. Preliminary analysis of the spatial and contextual data strongly suggested that VT-FR-140 is a multicomponent site containing discrete activity areas that probably date to different time periods. Nonetheless, a single site number designation seemed more appropriate for this large area until more definitive intra-site and inter-site boundaries could be established by further evaluation.

The bulk of the subsurface test units were aligned in three linear transects and one cluster (see Figure 28). These units focused upon evaluating a broad, crescent-shaped, alluvial terrace nearest the present riverbank and active flood plain margin. This area is bounded on the east and west by slightly higher terraces which gradually increase in elevation and extend outside of the immediate impact area. Four of the remaining six sampling units, composed of clusters of five test pits each, were excavated on the higher elevations within this latter area. One cluster was located on a secondary terrace adjacent to a tributary to the west. The last one was placed on top of an elongated ridge of outwash gravel which forms the northern limit of the tract.

It was noted that although fewer artifacts were obtained from the interior portions of the tract, this was possibly due to low sampling intensity. A more comprehensive subsurface sample would be necessary before an accurate delineation of the overall horizontal and vertical relationships of the prehistoric cultural material within each subarea could be realized.

The artifact inventory from VT-FR-140 contained a broad spectrum of prehistoric data classes, including chert and quartzite flakes (n= 332), fire shattered rock (n= 122), calcined bone (n= 59), scrapers or woodworking tools (n= S) and a few fragments of pottery (n= S). Two definite hearths (in Test Pits 19 and 33) and five probable hearths (Test Pits 26, 29, 40, 60 and 72) were encountered. See Figure 28. Given the low resolution provided by this initial sample, it was concluded that these seven cultural features represent only a small fraction of the total feature population within VT-FR-140.

The greater percentage of the subsurface artifacts was recovered from the Ap/B horizon interface and from the upper levels of the B horizon itself. Plowzones were present throughout much of the tract, but vary considerably in thickness, both as a function of relative age and because of the localized


MISSISQUOI HYDROELECTRIC PROJECT:
HIGHGATE FALLS TRACT 28
Vt-Fr-140
BIFACE
CHERT FLAKE
QUARTZITE FLAKE
QUARTZ FLAKE
MODIFIED FLAKE
FIRE CRACKED ROCK
CALCINED BONE
60 Meters
200 Feet
RIVER
MISSISQUOI
DATUM
TP 1
TP 5
TP 10
TP 15
TP 20
TP 25
TP 30
TP 35
TP 40
TP 43
TP 50
TP 55
TP 60
TP 65
TP 68
TP 73
TP 78
TP 83
TP 88
17,500 E
5,000 N

incorporation of alluvial material. Several soil sequences seemed to correspond with the micro·topographic. zones already described.

VT-FR-140 is a complex site and considerable descriptive detail has been omitted in this background summary. Sampling results from three specific locations are covered below, however, because they were returned to during the 1982 site evaluation program.

A discontinuous historic plowzone was evident along the beginning section of Transect 1 (Test Pits 1-10 in Figure 28). This transect cross-cut a portion of the high terrace which forms the eastern boundary of the tract. Artifacts recovered from this area were primarily found within the lower levels of the pl 9E.-zone and at the Ap/B horizon interface, with the notable exception of 'Test Pit 9. This test pit ccul:tclined a dense concentration of chert flakesat a depth of 50-69cm below surface, in the lower levels of the B horizon. While it was not possible to categorically demonstrate that this material was in a primary context, the. stratigraphic colunm. did not appear to be disturbed. If a definite correlation of the lithic flakes with the B/C horizon interface was borne out by further investigation, it seemed likely that this particular cultural manifestation might be of great antiquity, as soil building in such a seemingly stable local environment would be a slow process.

North of the broad flood plain,where the bulk of the testing occurred, prehistoric artifacts were encountered with lower frequency. In part this may be due to the fact that only 20 test pits were excavated. Documented cultural material was pri **arily** recovered from the base of a plowzone. However, excavation in **Tes**t Pit pf CluS!ter 5 (s..ee E'igY£.e 28) revealed a high concentration of quartzite debitage, clearly focused in the B horizon matrix. While not completely analogous to Test Pit 9, the presence of prehistoric material at this depth in yet another stable soil environment provided a second contextual indicator of the probability of multicornponents within VT-FR-140.

Only one cluster was excavated on the secondary terrace in the far western portion of the tract (see Cluster labelled TP 68 in Figure 28). The soil profiles in these five test pits were undisturbed by plowing, and conformed to a typical foresc soil developmental sequence. The matrix was composed of very fine sand to silt, with an apparent A2 and well developed B horizon nnderlying the A1 horizon. Cultural material recovered from this area was focused at the A/B horizon interface. The only exception was in /Test Pit 7"2>which contained evidence of a hearth extending into the B horizon.

In sum, VT-FR-140 was found to contain the highest density of prehistoric cultural material recovered from any of the larger sampling areas tested during the 1980 survey. While inherent limitations in the sample size prevented in-depth quantification of overall or site-specific data, the presence of discrete lithic flake scatters, hearths, hide processing and wood or bone-working tools, all suggested that a broad range of prehistoric human activity had occurred within this locality. Furthermore, the preliminary analysis of spatial and contextual data indicated that VT-FR-140 contained evidence of multiple occupations which probably dated to a number of cultural periods.

Site Evaluation Program: 1982

Sampling Scheme

The fieldwork undertaken at VT-FR-140 was complex, involving four physiographic subunits of study and several different sampling approaches. For those subareas of Tract 28 which had been sampled during the prelimi-- nary survey in 1980, efforts focused on defining the horizontal and vertical dimensions and the contents of areas which were known to contain prehistoric artifacts and features. The use of trenches played a central role here. Once it was recognized that distinctly older land forms existed away from the present river channel within this tract, additional sampling was undertaken in these subareas to determine whether or not evidence of early prehistoric occupations could be located. For this task a heavy reliance was placed on 50cm test pits which were excavated at 8m intervals along extended transects.

For ease of presentation, the following subareas will be discussed separately (see Figure 29): 1) the low flood plain adjacent to the present river channel which measures roughly 90 x 250m; 2) a 50 x 25m portion of high terrace located on the eastern edge of the tract; 3) a ridge which extends over 250m E-W, north of the low flood plain; and 4) a small, 20 x 20m segment of terrace located on the downstream end of the tract which was originally sampled with a cluster of five test pits. This last area is identified by the notation TP68 in Figure 28. In the text it is referenced as Test Pit 72-Extension, the westernmost test pit in the original cluster.

Low Flood Plain:

The low flood plain was originally sampled along a 370m (1200 ft) transect with 52 test pits spaced at 8m intervals. Thirty-one test pits were culturally positive. Two small areas which had been partially disturbed by a bulldozer were also surface collected (see Figure 28). Subsequent evaluation is based on a sample derived from two trenches from two 2 x 2m, one 1 x 3m and one 1 x 2m test units and from a cluster of seven 50 x 50 cm test pits.

In the eastern section of the low flood plain, Test Pits 16-21, excavated during the 1980 survey, had all proven positive (see Figure 28). In order to obtain an extended sample from this area, an additional seven 50 x 50 cm test pits were excavated at 4m and 8m intervals around Test Pit 19. This was designated Cluster 8, with the test pits numbered as TP 19-1 through 19-7 (see Figure 29).

Trench 2 (S7/48W79/80) was located towards the center of the flood plain. It was 2m wide and 46m long, thustotaling 92m^2. Of this area, 39m^2 was excavated by 1m units in order to obtain a reliable horizontal control sample along the length of the trench. In the northern portion of the trench, the plowzone was sampled using½;" mesh screens in nineteen 1m units. Testing below the plowzone in seven of these units (S7W80, S16W80, S16W79, S18W80, S25W80, S34W79 and S34W80) produced no evidence of past human activity. At the southern end of Trench 2, a continuous 2 x 10m section was sampled using 1/8" mesh screens. In this section between S40 and where he surface relief

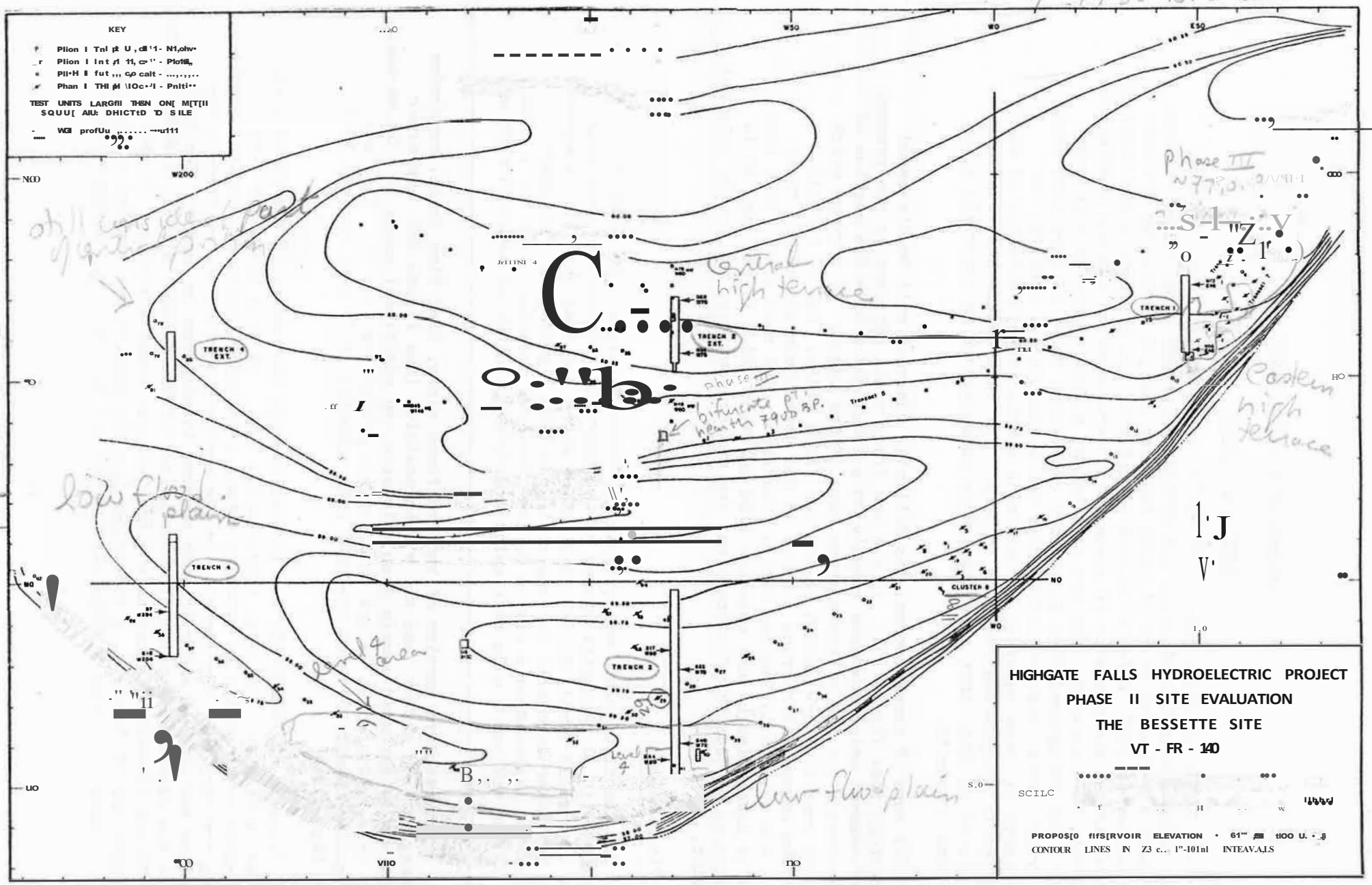


Figure 29. The Bessette Site: VT--FR-140.

drops, prehistoric artifacts are confined to a discrete 5cm-thick soil unit which has been buried by subsequent flooding. It has thus escaped the effect of modern plowing. The distribution of control pits can be seen in Figure 30. Once the near-surface samples had been obtained, the trench was taken down with the backhoe to depths of 2.5-4m. Trench walls were cleaned in order to look for deeply buried cultural deposits and to record the stratigraphic profiles. One small pit, designated Feature 8, contained a few quartzite flakes. It was located in the east wall of the trench (S27W79), but almost all of it had been removed by the backhoe. Its upper edge did intersect with the base of the plowzone. Therefore, it is contemporaneous with the occupations which left artifacts that are now incorporated in the plowzone, rather than with any deeply buried cultural component. A detailed profile was completed for the west wall of the trench between S17 and S44 (see Figure 8); a more schematic profile was done for the east wall between S22 and S40. It was from the base of this trench that samples of logs were obtained at intervals for radiocarbon dating.

A 1 x 3m test trench (S42/44W74) was excavated using 1/8" mesh screens just 4m to the east of the southern end of Trench 2 and immediately adjacent to Test Pit 40 which had been dug during the 1980 survey (see Figure 29). This small trench was completed in order to resolve an apparent inconsistency in sampling results. During the 1980 survey, six chert flakes had been found in TP40 at a depth of 45-55cm in a distinct alluvial bed. When this same alluvial bed was encountered in the southern end of Trench 2, however, no artifacts were found in the two 1 x 1 m control pits (S44W79/80). Ultimately, added testing proved that the alluvial bed was continuous between Trench 2 and TP40, but that dense cultural deposits (including two hearths) were located only near TP40, while little evidence of cultural activity extended 4m west into the area cut by the trench.

As originally planned, another long trench ("Trench 3") was to have been excavated 50m west of Trench 2. As a first step, the excavation of two 2 x 2m and one 1 x 2m control pits was begun--S35/36W131/132, S47/48W131/132, and S56W131/132, respectively (see Figure 29). Before this work had been completed, however, part of Trench 4 had been excavated to the west. The stratigraphic sequences encountered in Trenches 2 and 4 were very similar, and, because the focus of our efforts at that time was on understanding the genesis of the flood plain, it was concluded that the excavation of Trench 3 would only produce redundant stratigraphic information., Thus, Trench 3 was never dug.

Trench 4 (N12-S18W203/204) was excavated towards the western edge of the flood plain (see Figure 29). It encompasses a 2 x 30m area. At the north, middle and southern end of the trench, three 2 x 2m test units were divided into 1x1m units and excavated by hand as control pits (N11/12W203/204, S3/4W203/204, S17/18W203/204). In each of these 2 x 2m units, an additional 15-20cm level was sampled below the base of the plowzone, but no artifacts were recovered. The backhoe was used to remove the plowzone in the remaining 2 x 2m units within the trench. The backdirt piles from all but one unit (S6/8W203/204) were screened for artifacts using ½" mesh. Locations of the control pits and of the other 2 x 2m units can be seen in Figures 36-40.

Subsequently, the trench was taken down with the backhoe to the water table (ca. 3m) between S7 and S18. Trench walls were cleaned and inspected for deeply buried cultural deposits, but none were apparent .. A stratigraphic profile was prepared from the west wall between S7 and S18.

High Terrace--Eastern Portion:

At the eastern end of Tract 28, the local topography reaches its highest point at an elevation of 199-200 ft m.s.1. (60.5-61 m). Sampling in this area during the 1980 survey had produced prehistoric artifacts in Test Pits 5, 7, 8 and 9. In Test Pit 9 a concentration of chert flakes was encountered between 50 and 69cm, clearly below the modern plowzone. For this reason, Trench 1 was extended north from Test Pit 9 (see Figures 28 and 29). The overall length of the trench was 22m, running between N56E47/48 and N78E47/48. Two 2 x 2m control pits were divided into 1 x 1 m units excavated at the northern and southern ends of the trench, while a 1 x 2m control pit was excavated in the middle. The trench was also sampled by screening the plowzone and the top of the B horizon soils which the backhoe removed from another five 2 x 2m units between N60 and N72. At the southern end of the trench, an additional 2 x 2m unit (N55/56E48/49) was excavated by 50cm blocks when a dense lithic workshop was encountered. The locations of these sampling units can be seen in Figures 42-47.

The area just to the east of Trench 1 was also known to contain prehistoric artifacts. During the 1980 survey test pits had been spaced at 8m intervals. In order to better define the horizontal distribution of artifacts recovered in Test Pits 5, 7, 8 and 9, 50cm test pits were staggered midway between each of the original test pits, from Test Pits 2 through 9. (These are referenced as 8-1, 7-1, 6-1, etc.) Two additional transects containing eight and three 50cm test pits, respectively, were off-set at a distance of 4m to either side of the first transect. (These are referenced as Transects 7 and 8.) See Figure 29.

High Terrace--Central Portion:

The high topographic feature which was explored with Trench 1 and the adjacent test pit transects extends over 250m to the west. Based on the stratigraphic sequences encountered in Trench 1, it was thought that this extended ridge had formed from alluvial overbank deposits which had built-up next to a former river channel. Based on both topographic differences and the dissimilar stratigraphic sequence encountered between Trenches 2 and 4 on the low flood plain and Trench 1, it was also clear that this ridge might substantially predate the formation of the flood plain. It seemed likely, therefore, that archaeological sites dating from an early period might be encountered here. In order to confirm the presence of a similar alluvial sequence across this ridge, Trench 2-Extension and Trench 4-Extension were excavated (see Figure 29).

Trench 2-Extension (N55/69W79/80) had an overall length of 14m. To test for cultural artifacts, five 50cm test units were dug by hand along the west side of the trench at 4m intervals. One test pit proved to be

positive and this was expanded into a 1 x 2m unit (N63/65W80). No other sample was obtained from the trench due to lack of time. The trench was taken down to channel gravels and the walls were cleaned. No buried cultural deposits were identified. A generalized profile was made of the east wall of the trench between N56 and N68.

Trench 4-Extension was excavated on the downslope side of this ridge to the west. It measured 12m in length (N50/62W203/204). Soils from the plowzone and the upper B horizon were removed in two levels and by 2 x 2m squares by the backhoe down the length of the trench. The plowzone from one of these 2 x 2m units (N60W204) was entirely screened, while about 50% of the plowzone in N56W204 and N52W204 was screened. A 50% sample was obtained from the upper B horizon soils in each of these units. Nothing of a cultural nature was found. The trench was then lowered to the water table where old channel gravels were encountered. A log was recovered in N56W204 just above the gravels and has subsequently been dated at 8090 ¼ 110 B.P. No wall profile was drawn.

Between Trench 1 on the east and Trench 4-Extension on the west, this ridge encompasses well over 12,000 m^2 (1,250,000 ft^2). Of this area, only 7m^2 had been exposed during the 1980 reconnaissance survey, with the horizontal coverage spread out among four test pit clusters containing five test pits each (see Figure 28). Surprisingly, at least one test pit in each cluster contained prehistoric artifacts, but no temporally diagnostic tools could be identified. For this reason, an area of 4m^2 (N44W156/157, N45W155/156) was excavated next *to* TP83. In an attempt to provide at least a minimal sample for the area between Trench land Trench 4-Extension, fifty-four 50cm test pits were excavated. These were arranged at 8m intervals along four, E-W trending transects (see Figure 29). The intent here was only to determine the presence or absence of prehistoric deposits. Of the fifty-four test pits, seven contained artifacts.

Terrace--Western Edge:

The final area to be tested consists of a level area adjacent to the river at the far western edge of Tract 28. A cluster of five test pits had been used to sample this location in 1980 (see Figure 28, TP68). Chert and quartzite flakes, along with burned bone, had been recovered at shallow depths in four of the five test pits. Not only did deposits appear to be fairly dense, but this area had never been plowed. It was anticipated that important cultural information could be obtained from additional sampling. Thus, a 2 x 2m unit was excavated on the western edge of this level terrace adjacent to TP 72 in order to evaluate the site's integrity and data content. The 2 x 2m unit was designated Test Pit 72-Extension.

not in Fig. 29

Sampling Results and Interpretations

Low Flood Plain:

Eastern, middle and western portions of the low flood plain were partially sampled through the use of two extended trenches, two 2 x 2m, one 1 x 3m and one 1 x 2m test units, as well as a cluster of seven 50. x 50 cm test pits. The distributions of various artifact classes recovered from Trenches 2 and 4 and from the 1 x 3m unit (S42/44W74) are presented in Figures 30-40. Composite artifact inventories and cultural features are listed below by individual sampling units.

Artifacts and Features Recovered:

Cluster 8, Test Pits 19-1 to 19-7 (50 x 50 cm)

Five of seven test pits were positive.
All contained only a few chert flakes each,
with the total sample equaling 29.

Trench 8

Feature 8 -- the remnants of a pit exposed by the backhoe in the east wall of Trench 2 (S27W79). The top had been truncated by modern plowing. It was steep walled and had a nearly level bottom. It measured 80cm at the top, 64cm at the base and 48 cm deep. The pit fill was light brownish gray (10YR6/2) in color and contained 6 chert flakes, 21 quartzite flakes and 1 piece of burned bone. With an estimated 85-90% of the pit missing, no specific function for the feature could be inferred.

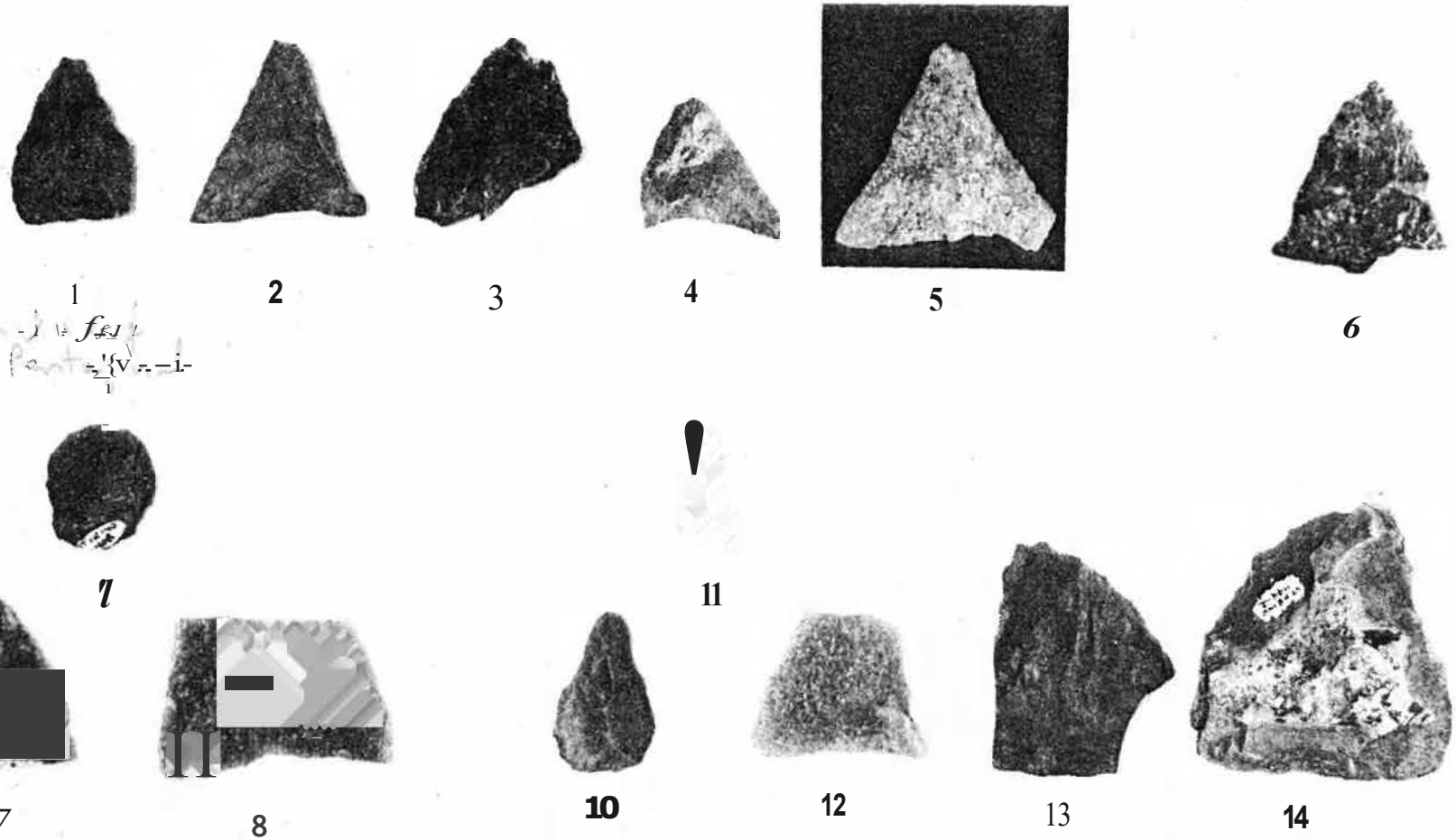
1 chert scraper
1 chert biface fragment (Feature 8)
35 chert flakes
14 quartzite flakes
19 pieces of bone (calcined or burned)
3570 g of fire cracked rock

S42/44W74--a 1 x 3m unit located just east of Trench 2
2 cultural features:

Feature 3--about half of a shallow hearth encountered in S44W74. It extends into S44W75. At its deepest point along the west wall of S44W74, it is 8 cm deep; it is estimated to be about 60-70cm in diameter. The hearth fill is characterized by an intense reddish brown (5YR4/4) staining and small p eces of burned bone.

Feature 4--the edge of an apparent hearth encountered in the SW corner of S44W74. Most of it is contained in an adjacent, but unexcavated area. The fill is a greasy, grayish brown-to-light brownish gray (lOYRS/2-6/2) very fine sand which is heavily infused with charcoal.

1 chert projectile point tip (Plate III: 6)
1 chert biface fragment
956 chert flakes
8 quartzite flakes



VT-Fr-140

Plate Ill

1. Chere Jacks Reef Pentagonal point (1318): S4711112; 2. chert Ivanna point ('329): S48\.1132, feature 7; 3. ohrt btfucc tip (#130): $L.8Wl32, feature 7; . cherc Levanna poll\t (f.JJl): S48Wl 32; S. quartzite Li!v..inna polnt (12119): S48Wl31; 6, chcn poii;it tip (B27S): S44W74; 7. ch<>rt point d p (tfl79): Sl7W203; S. quart:tite Levnnna ()e>int busc (!'416): !11011204; 9, chert sc-.:aper (81,08): N'.!11204; 10. chert pe.cforator/s.:raper (0602): -11: 72 72 Exe.; 12. quan:z:'lce l.cvanna poinc hase (1501-2): T. P. 72 £..:t.; 13, chert pre.form fr.ai::ienc (9506-4): T.P. 72 Ex .; 14. chert preform {494-2): i.P. 72 Ext. (11 is from VT-FR-134: chert drill li\l 036-1): tll6W).

7 quartz flakes
108 tiny fragments of pottery
245 pieces of burned bone (108 from Feature 3)
38 fire cracked rock fragments (541 g)

S15/16W131/132--a 2 x 2m unit excavated as a control pit for "Trench 3"

2 chert flakes

S47/48W131/132--a 2 x 2m unit excavated as a control pit for "Trench 3"

1 cultural feature:
Feature 7--a large hearth which measures roughly 1.25m N-S, 1.5m E-W and about 8-10cm deep. The matrix is a grayish brown-to-reddish brown (10YRS/2, 10YR4/4) very fine sand which is heavily infused with charcoal and small pieces of burned bone. A radiocarbon date of 1180 ± 90 B.P. was obtained from a charcoal sample. Located either within or immediately adjacent to the hearth were:

4 chert projectile points (Plate III: 1, 2, 4)
2 quartzite projectile points (Plate III: 5)
2 chert biface fragments (Plate III: 3)
1 quartzite biface fragment
721 chert flakes
190 quartzite flakes
7 quartz flakes
1976 pieces of burned bone
94 fire chacked rock fragments

S56 W131/132--a 1 x 2m unit excavated on the edge of the flood plain

12 chert flakes
3 quartzite flakes
1 tiny piece of pottery

Trench 4 (N12-S18W203/204)

3 quartzite projectile point fragments (Plate III: 8)
1 chert projectile point tip (Plate III: 7)
1 chert scraper (Plate III: 9)
182 chert flakes
88 quartzite flakes
2 quartz flakes

In several respects, the composite sample derived from the 1980 and 1982 field seasons is highly informative about some of the characteristics of the archaeological data which are distributed throughout this flood plain. First, of all the areas of comparable size within the Highgate Falls Prehistoric Archaeological District, the flood plain at VT-FR-140 appears to have been

the most intensively utilized. Multiple occupations are presumed to have occurred. Second, radiocarbon dates have been obtained from three logs at the base of the alluvial sequence of overbank sand deposits which formed this flood plain. From these dates (6400 ± 70 B.P., 5650 ± 80 B.P., 5350 ± 70 B.P.), it can be inferred that this flood plain was available for prehistoric occupation by 5000-6000 years ago. It is assumed, therefore, that all evidence of prehistoric activity will post-date this period. Third, it is also apparent from the stratigraphic profile in Trench 2 (see Figure 8) that most evidence of prehistoric activity which does occur is likely to exist only in the top 50cm of deposits which formed once the flood plain began to stabilize.

Fourth, with but three exceptions--TP29, 49 and 51 which were excavated during the 1980 survey (see Figure 28)--all test pit or larger sampling units exposed artifacts in only two stratigraphic contexts. For the majority of the flood plain, the surfaces on which prehistoric occupations occurred have been incorporated into a modern plowzone. This is evident from the sampling results obtained during the 1980 survey and was confirmed by the 1982 field work -- for example, prehistoric artifacts were recovered exclusively from the plowzone, at the eastern end in TP16-21 and in Cluster 8 (TP19-1 to 19-7); in the middle of the flood plain in TP43, 44-47, along Trench 2 between S7 and S40 and in S16W32; and at the western end in TP53, -54; 58-61 and along the entire 30m length of Trench 4.)

Along the southern edge of the flood plain, the topography drops 25-30cm as the current river bank is approached (see Figure 29). This area has been subjected to heavier flood deposition than higher portions of this flood plain within the last thousand years. As a result, older land surfaces which contain extensive evidence of prehistoric occupations have been buried at depths of 30-50cm and have not been disturbed by modern plowing. Where this old surface is buried, artifacts are clearly associated with a 5cm-thick alluvial deposit of very fine sand. Based on the discernible stratigraphic sequence in Trench 2, this deposit has been designated "Level 4". Level 4 was identified during the 1980 survey in TP32-35, 39-42, 48-50 and more recently in Trench 2 from S40-S48, in S42/44W74 and in S47/48W131/132 (see Figure 29). Thus, a maximum area of 80 x 20 mis involved where the integrity of cultural deposits should be extremely good. The excellent condition of the hearths in S47W132 and S44W74 supports this conclusion. (In a number of instances, Level 4 is capped by a thick deposit of medium-coarse sand which has been designated Level 3. Level 3 was used as a distinct marker bed when the backhoe removed the overburden above Level 4 at the southern end of Trench 2.)

As Level 4 extends upslope to the north away from the river, it gets progressively higher in the profile until it merges into the modern plowzone (see Figure 8). For this reason, prehistoric artifacts recovered within the plowzone on the higher portions of the flood plain are likely to be at least roughly contemporaneous with those buried at greater depths close to the river.

Fifth, although relatively few, tempo!ally diagnostic tools have been recovered. The presence of triangular Levanna-type projectile points (Feature 7, S47/48Wl31/132; Trench 4, NlOW204) and aJack'sReef Pentagonal point (S47W132) confirms that one, and probably more, late Middle-early Late Woodland period occupations are represented. Several of the Levanna and the single Jack's Reef points were directly associated with a hearth radiocarbon dated at 1180 ± 90 B.P. An apparent association of Level 4 with scattered charcoal recovered in S43W74 is associated with a radiocarbon date of 510 ± 80 B.P.

Sixth, as noted above, deeper and potentially older cultural deposits may have been encountered in three of the test pits excavated during the 1980 survey. A fire cracked rock was recorded at a depth of 60-70cm in TP29; 2 chert flakes were recorded at 80-90cm in TP49; 2 fire cracked rocks were recorded in situ at 75-80cm in the walls of TP51 (see Figure 28). Test pits 49 and 51 were located along the southern portions of the flood plain where flood deposition has occurred to the greatest extent, and, of all the sampled areas within the entire District, this is the most likely to contain a deeply buried cultural horizon. Stratigraphic profiles recorded from TP49 and 51 indicate that both of the chert flakes and fire cracked rock came from depths below the artifact-bearing "Level 4" evident in adjacent test units. Because TP29 is located on the higher portion of the terrace, a cultural artifact at a depth of 60-70cm is totally anomalous. The potential significance of possibly a third stratigraphic level cannot be determined within further testing.

Seventh, although there are few subareas within this low flood plain where artifacts have not been recovered, it is apparent from a brief review of the composite distributional patterns identified from the 1980 and 1982 surveys that focal activity areas do exist. 1) In the eastern portion of the flood plain, TP16-21 and Cluster 8 identify an area of about 40 x 20m where artifacts were repeatedly uncovered (see Figure 29). These include a quartz scraper, 57 chert flakes, 2 quartzite flakes, 4 pieces of pottery, 40 pieces of calcined bone and 4 fire cracked rock fragments. For 30-SOm to either side of this zone, no artifacts were identified in the 35cm test pits excavated in 1980. 2) The most dramatic incidence of intense clustering of artifacts can be seen by comparing the distributions of artifact classes in Level 4 from the southern end of Trench 2 (S40-S48) with the distributions from a 1 x 3m trench (S42/44W74) adjacent to it (see Figures 30-35). In both test units, 1/8" mesh screens were employed. From an area of 18m^2 at the southern end of Trench 2, only 20 chert flakes, 3 quartzite flakes and 5 small fragments of fire cracked rock were recovered. Just 4m to the east, in S42/44W74, two cooking hearths were exposed and flake counts jumped to over 100. 11- Similarly, a dense clustering of artifacts is present around the hearth (Feature 7) in S47/48Wl31/132. Ten meters east of this 2 x 2m unit, 35 chert flakes were recovered in TP33 (35x 35 cm) where another hearth was encountered during the 1980 survey (see Figure 29). Only 1 chert flake and 1 fire cracked rock fragment were found in two 35 x 35 cm test pits between TP33 and S47/48Wl31/132. Flake distributions also drop off slightly west of S47/48Wl31/132 in TP48-52. 4) Although no features were exposed in Trench 4, two artifact clusters are evident over the 30m length of the trench. The first, consisting of increased quantities of chert and quartzite flakes, as well as several projectile point fragments, extends for 10-12m (Nl-Nl2) at the northern end of the trench. The second consists of

increases of chert and quartzite flakes in S14-18 at the southern end (see Figures 36-39).

The discrete horizontal clustering which is evident throughout this low flood plain has significant implications. First, given the apparent artifact voids between several of these clusters, it is likely that distinct occupations are involved. Second, not only are occupations likely to be temporally distinct, but the activity areas associated with such occupations that can be defined by the patterning of artifacts and features are spatially distinct as well. Thus, for any studies which seek to understand whether cultural patterns remained stable or changed through time by comparing the artifacts and deposits left from a series of occupations, the clarity of the archaeological information at VT-FR-140 would be immeasurably helpful.

Eighth, from a preliminary analysis of the food remains recovered from Features 3, 4 and 7, and of the scattered bones from other areas, it is likely that several of the recognized artifact and feature clusters represent late spring-summer residential sites. These probably acted as base camps from which the occupants carried out a variety of activities. If this interpretation is correct, the Middle-Late Woodland period sites located here represent a distinctly different seasonal and functional class of site than those encountered downstream within Tracts 1-8, and are at least seasonally distinct from VT-FR-134 upstream. Inferences of seasonality and length of residence are based primarily on the bone analyses and related information presented below (see Figure 41).

Trench 2:

Sixteen bone fragments were recovered from twenty-two test squares in the north half of this trench (see Figure 32). All of them derive from a plowzone context and all of them were found in " mesh screens. Greater recovery might have been possible with different techniques. (No bone was recovered from the twenty meter-square units in the southern portion of the trench even though 1/8" -mesh screens were used here.) Five of the sixteen pieces of bone could be partially categorized (see Figure 41). They include two deer phalanges (toe bones), one bear phalange, a long bone fragment of a medium-sized mannnal (woodchuck range), and a large rib fragment which is twice the size of that of deer (probably a domesticate of the recent past). None of these bones are associated with any particular cluster of prehistoric artifacts. They probably represent the random scatter of refuse on the periphery of a more focused activity area nearby.

One point to note is that of the total bone count, 30% of the sample was identifiable in one way or another. This suggests that bone preservation, even in a plowzone context, is sufficient to warrant further sampling in such soil units in areas where other artifact densities are higher.

Feature 8, identified in the east wall of S27W79 and extending into S27W78, contained two unidentifiable bone fragments, one of which may have been derived from a medium-sized mannnal.

S42/44W74 (Feature 3):

This 1 x 3m unit was excavated adjacent to Trench 2 which lies 4m to the west (see Figure 29). Unlike the trench where no bone was found in the

Site No. VT-FR-140

Sampling Unit Trench 2

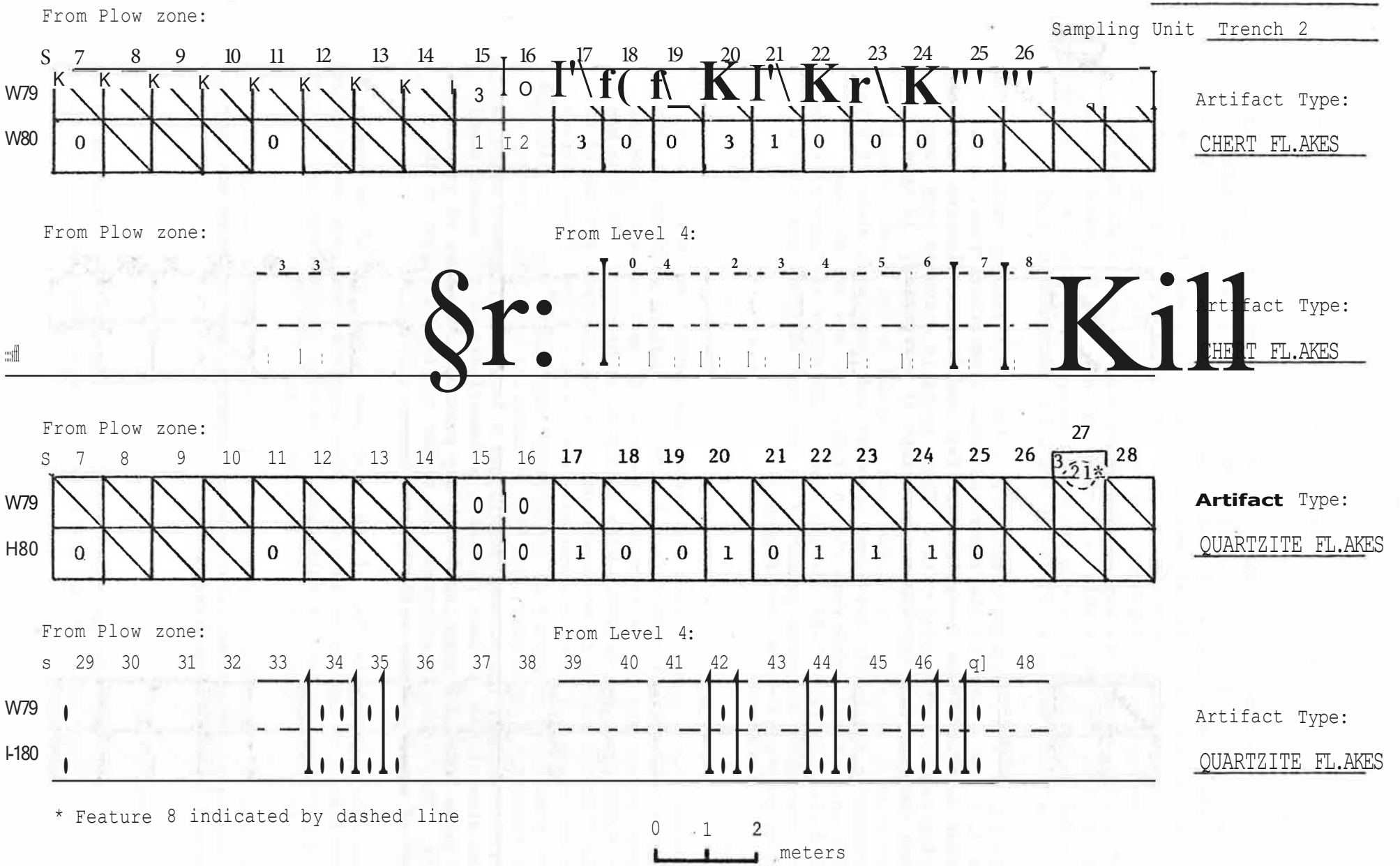
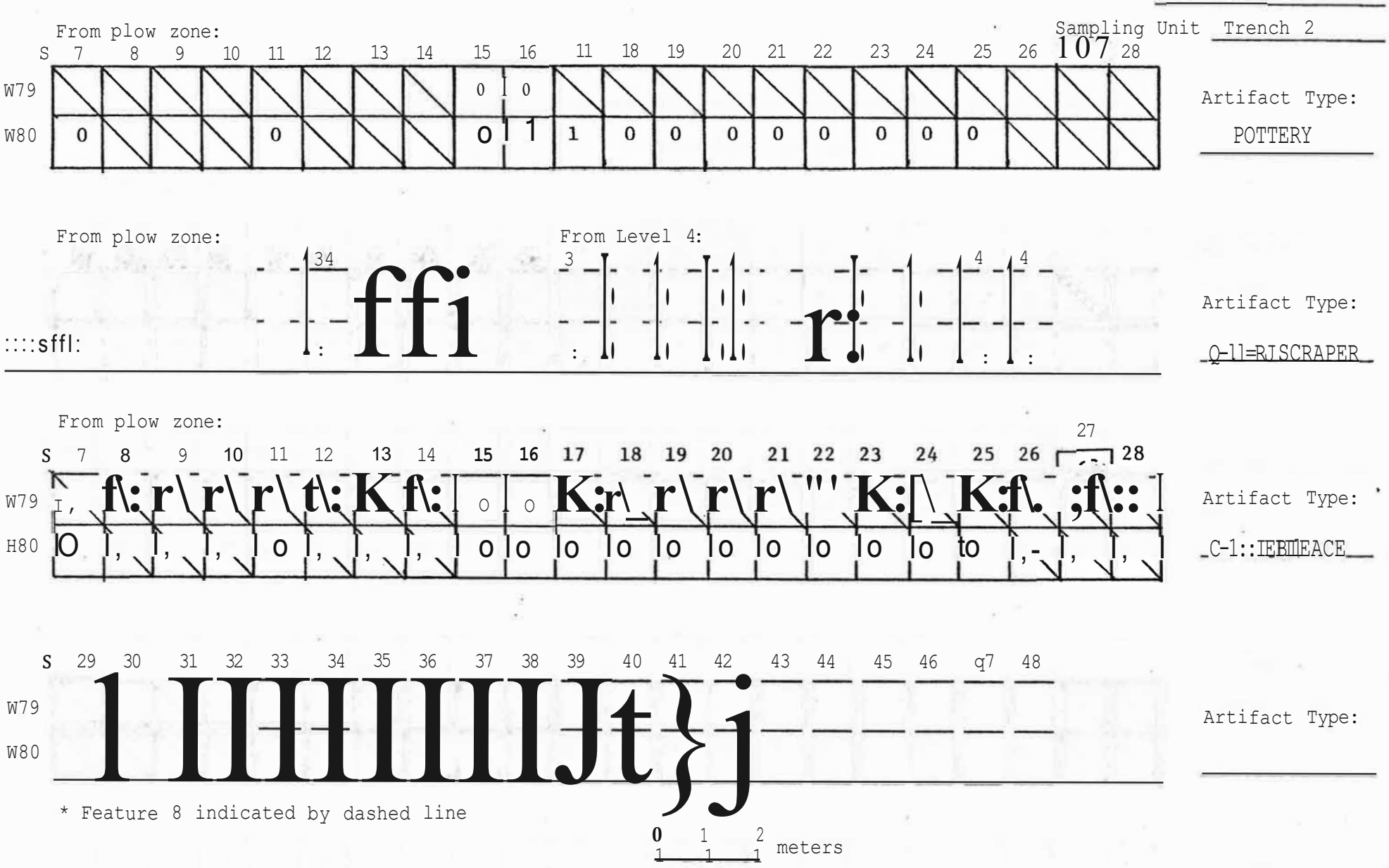


Figure 30.; Distributions of Chert and Quartzite Flakes: VT-FR-140, Trench 2.

Site No. VT-FR-140

Sampling Unit Trench 2

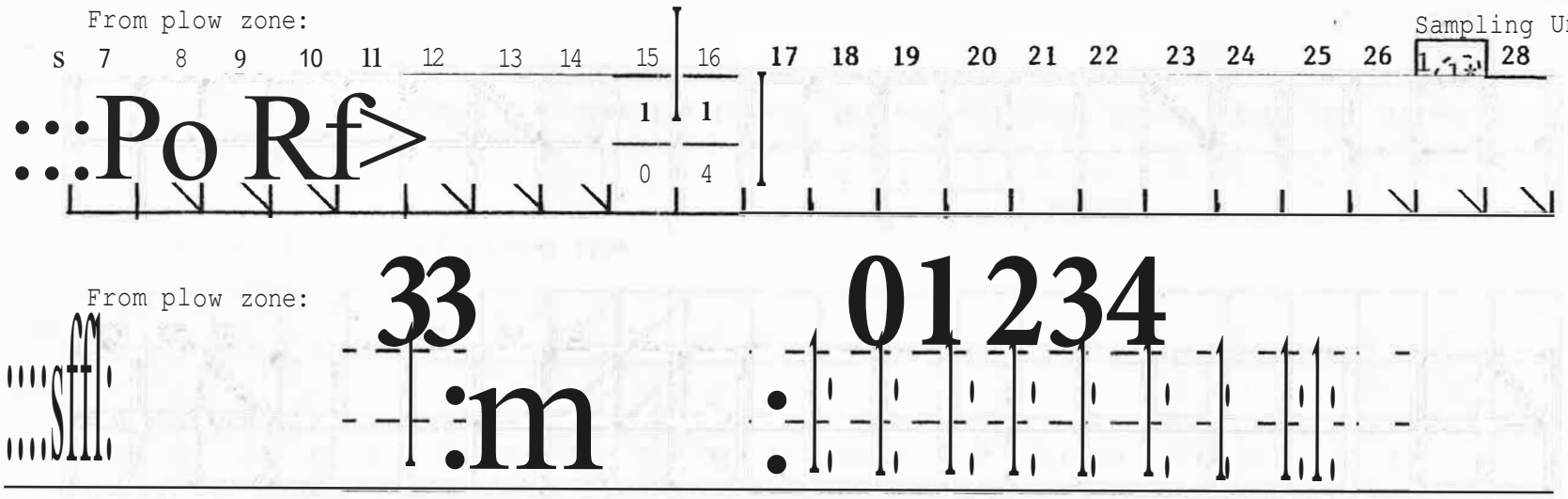


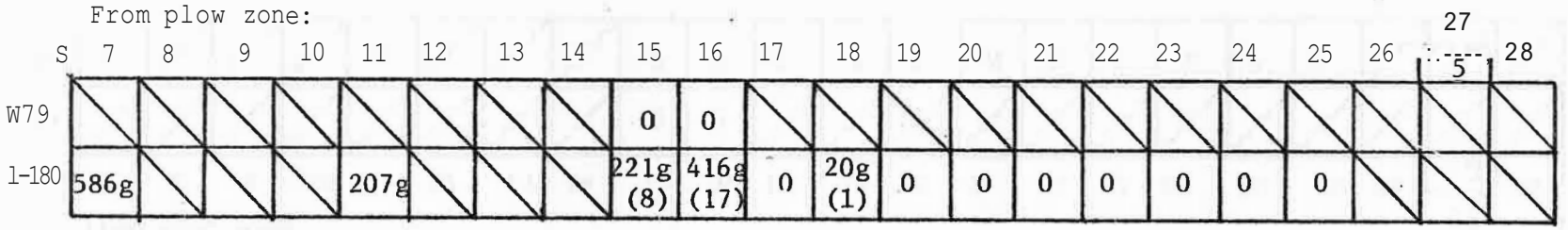
* Feature 8 indicated by dashed line

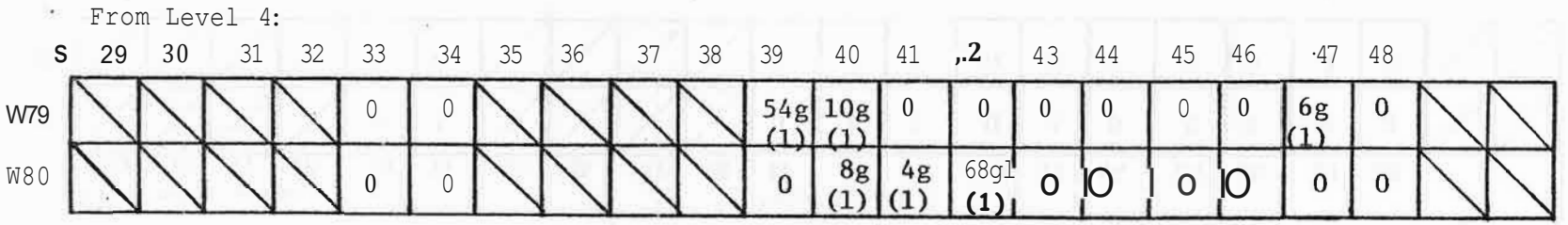
Figure 31. Distributions of Pottery and Chert Tools: VT-FR-140, Trench 2.

Site No. VT-FR-140

Sampling Unit Trench 2







* Feature 8 indicated by dashed line

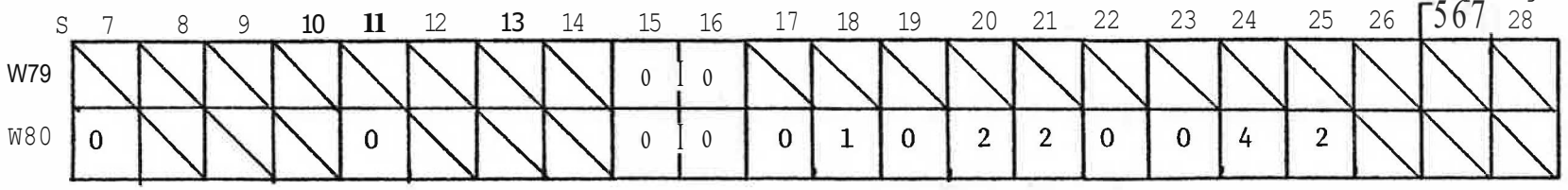
0 1 2 meters

Figure 32. Distributions of Bone and Fire Cracked Rock: VT-FR-140, Trench 2.

Site No. VT-FR-140

Sampling Unit Trench 2

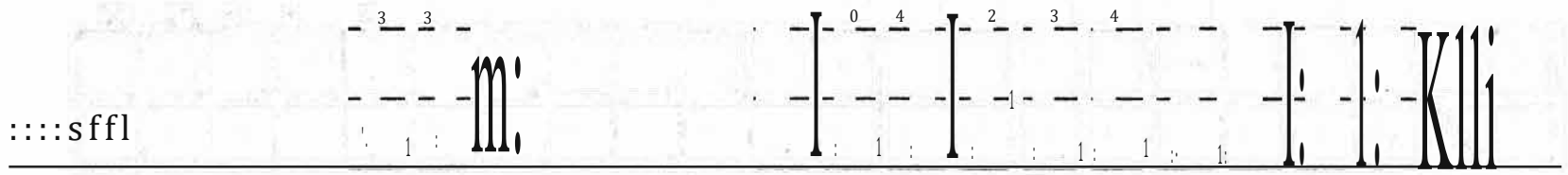
From plow zone :



Artifact Type:

BRICK FRAGrvENTS

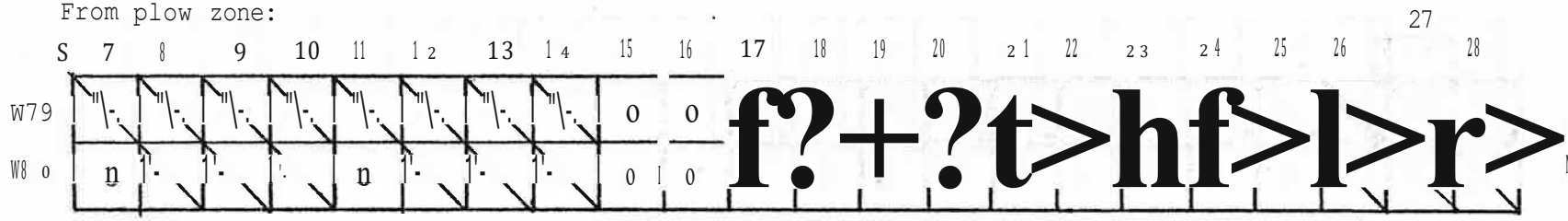
From plow zone:



Artifact Type:

BRICK FRAGMENTS

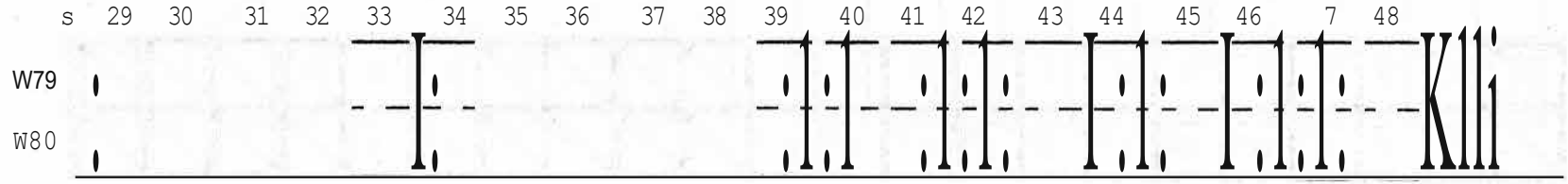
From plow zone:



Artifact Type:

NiIILS, SQW\RE

From plow zone:



Artifact Type:

NAILS , SQUARE

q } i meters

Figure 33. Distributions of Historic Artifacts: VT-FR-140, Trench 2.

Site No. VT-FR-140

Sampling Unit Trench 2

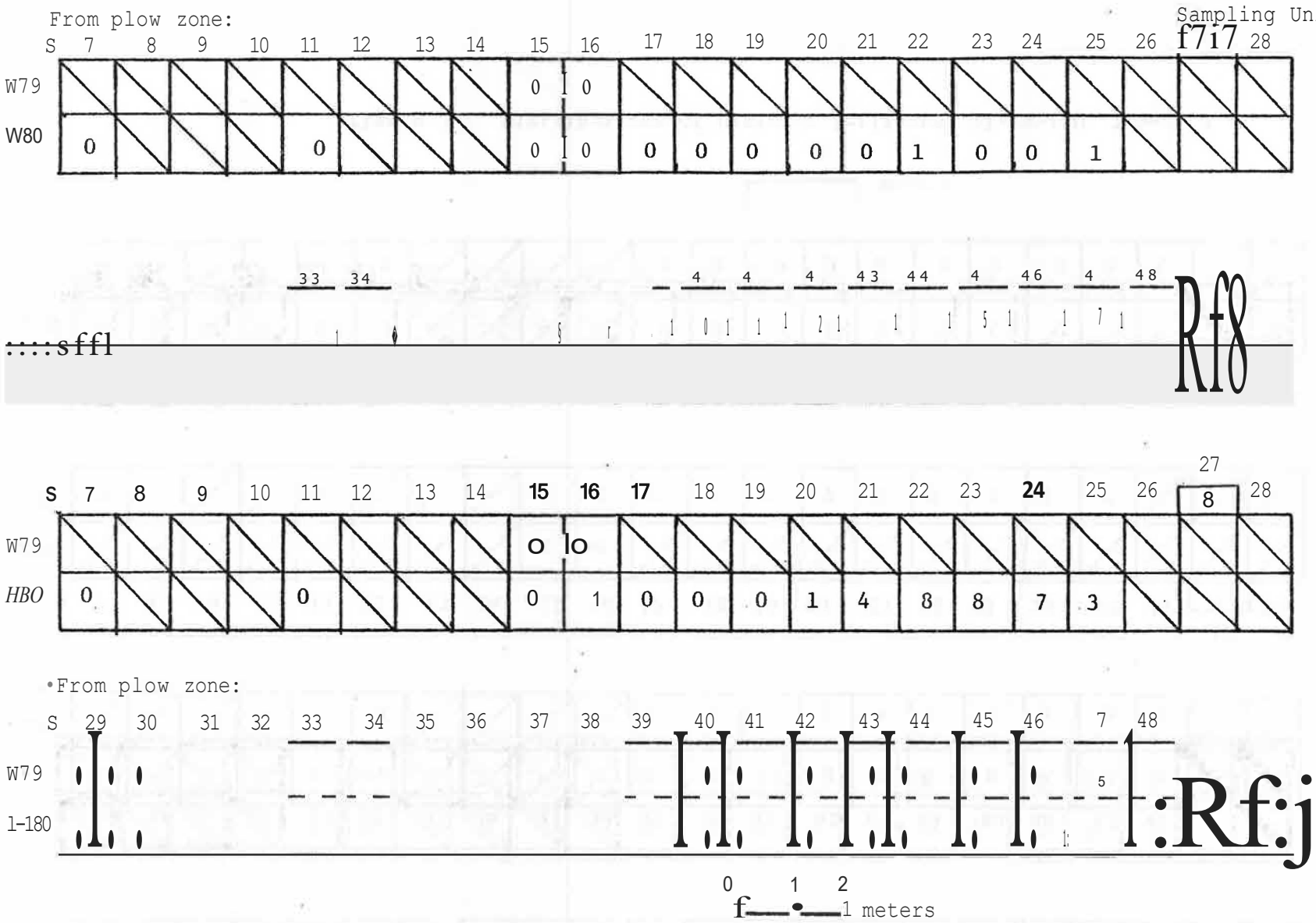


Figure 33 (continued). Distributions of Historic Artifacts: VT-FR-1:!.9, Trench 2.

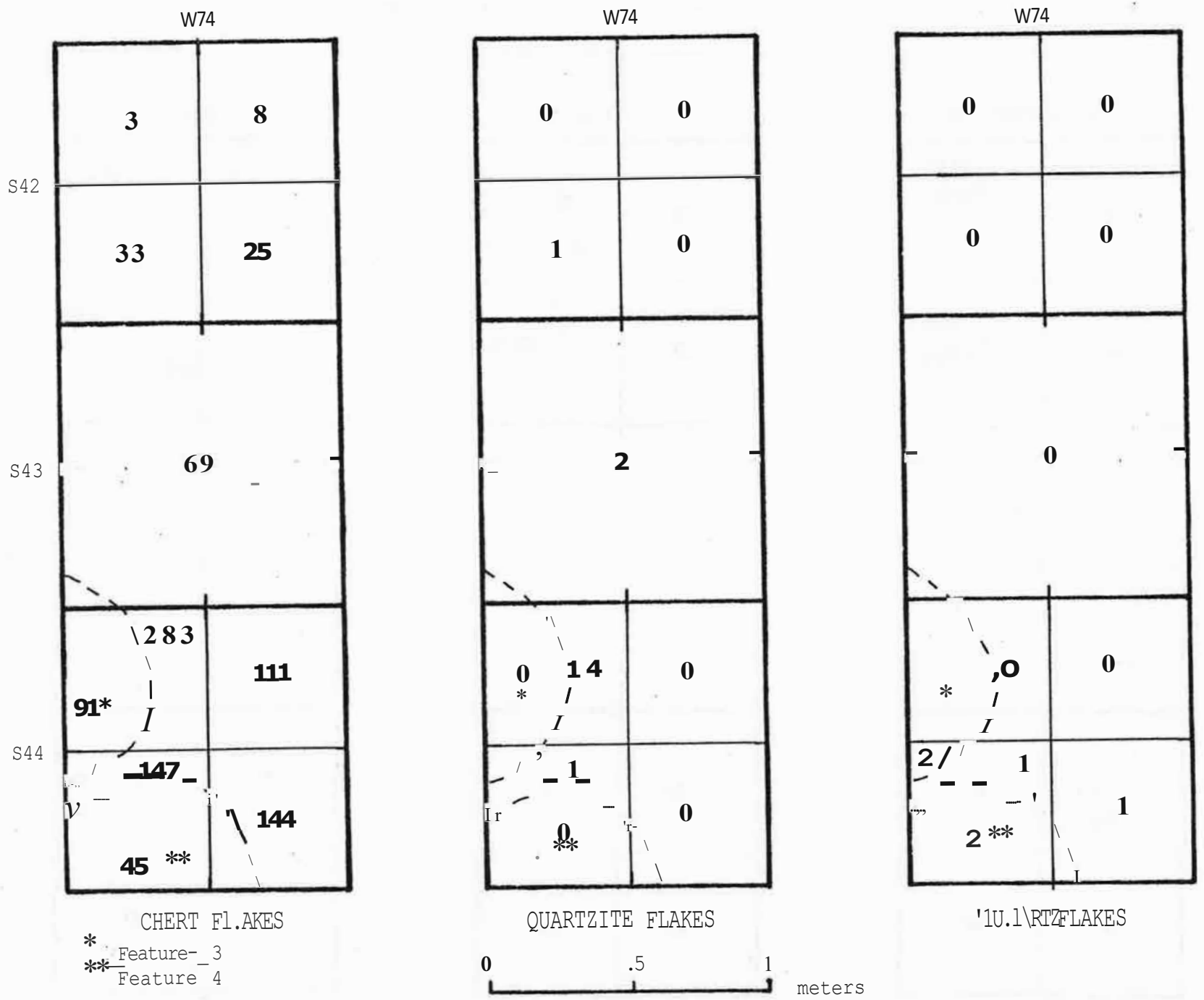


Figure 34. Distributions of Chert, Quartzite and Quartz Flakes: S42/44W74, Level 4, VT-FR-140.

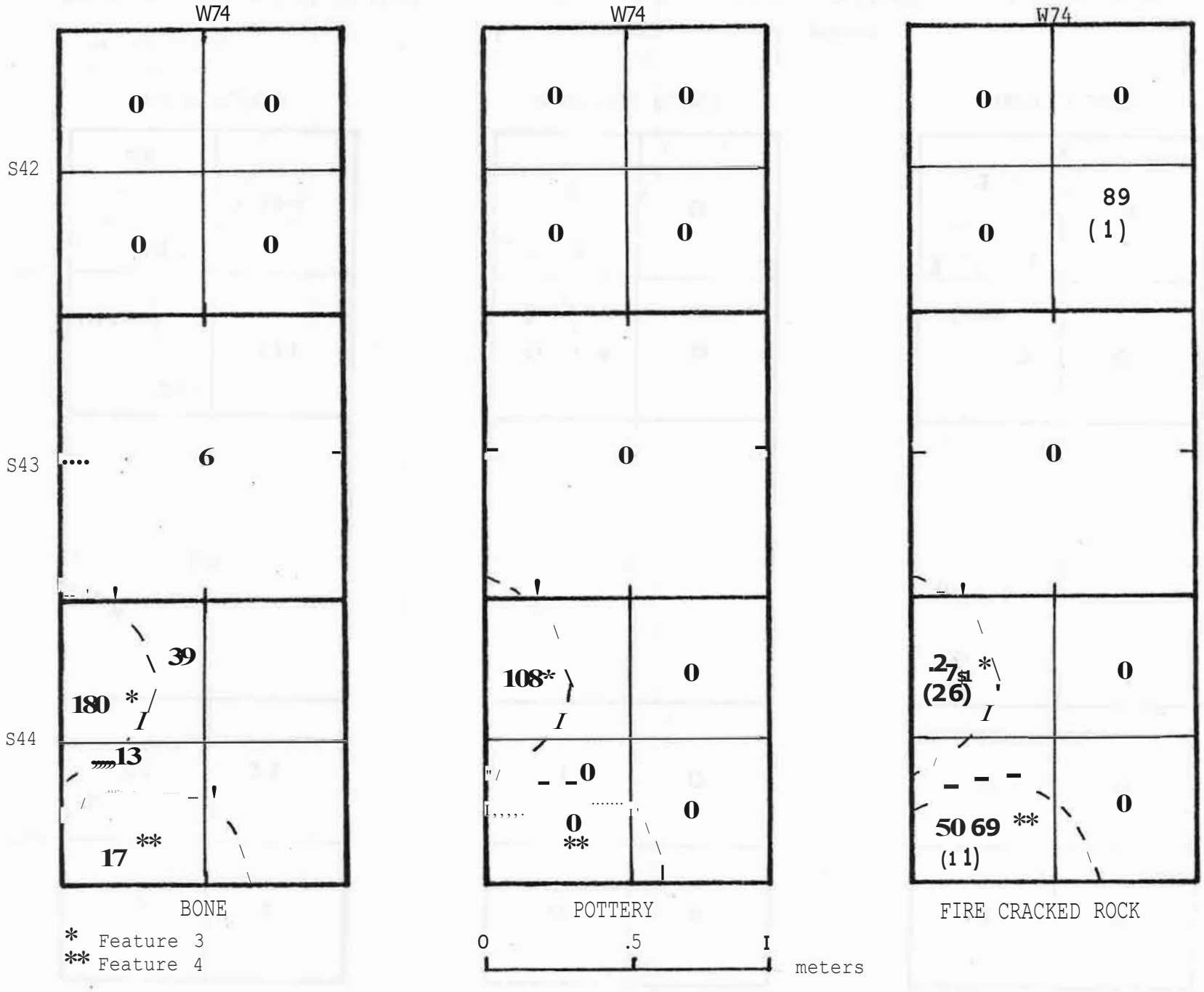
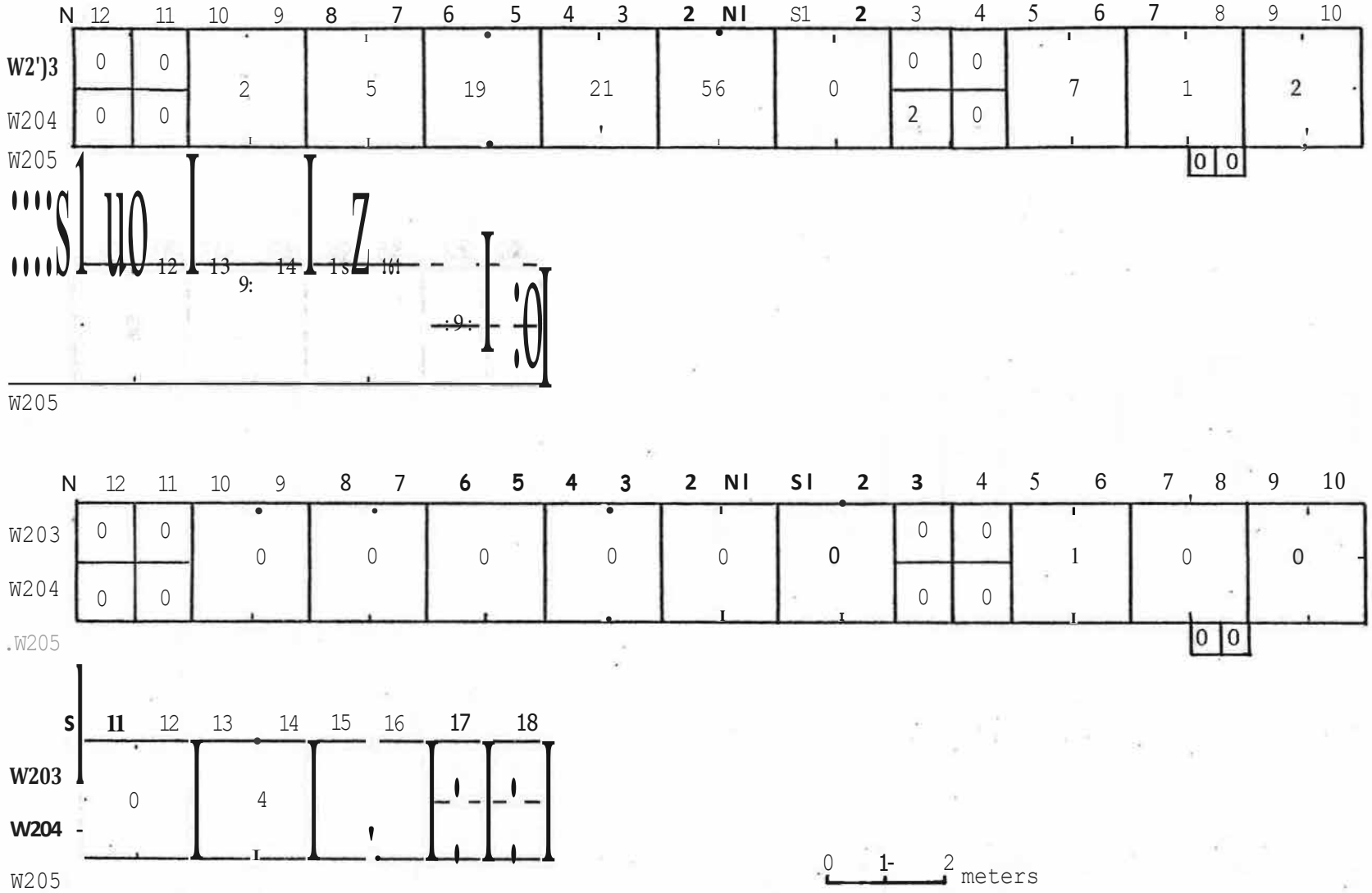


Figure 35. Distributions of Bone, Pottery and Fire Cracked Rock: S42/44W74, Level 4, VT-FR-140.

Site No. VT-FR-140

Sampling Unit Trench 4



Artifact Type:

CHERT FLAKES

Artifact Type:

CHERT FLAKES

Artifact Type:

CHERI FRAGMENTS

Artifact Type:

CHERI FRAGMENTS

•Figure 36. Distributions of Chert Flakes and Fra ents: VT-FR 140, Trench 4.

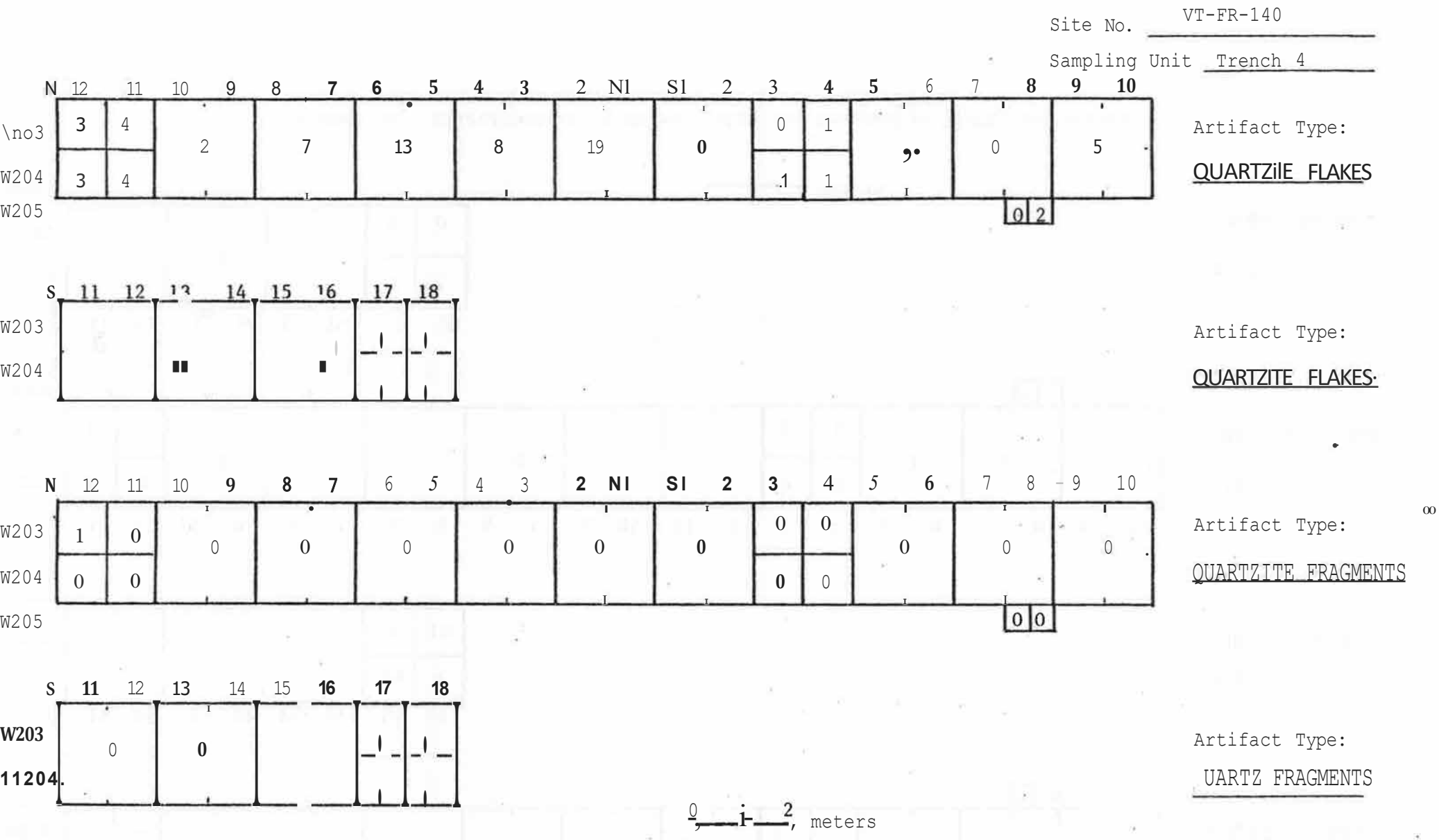


Figure 37. Distributions of Quartzite and Quartz .Flakes and Fragments, VT-FR-140, Trench 4.

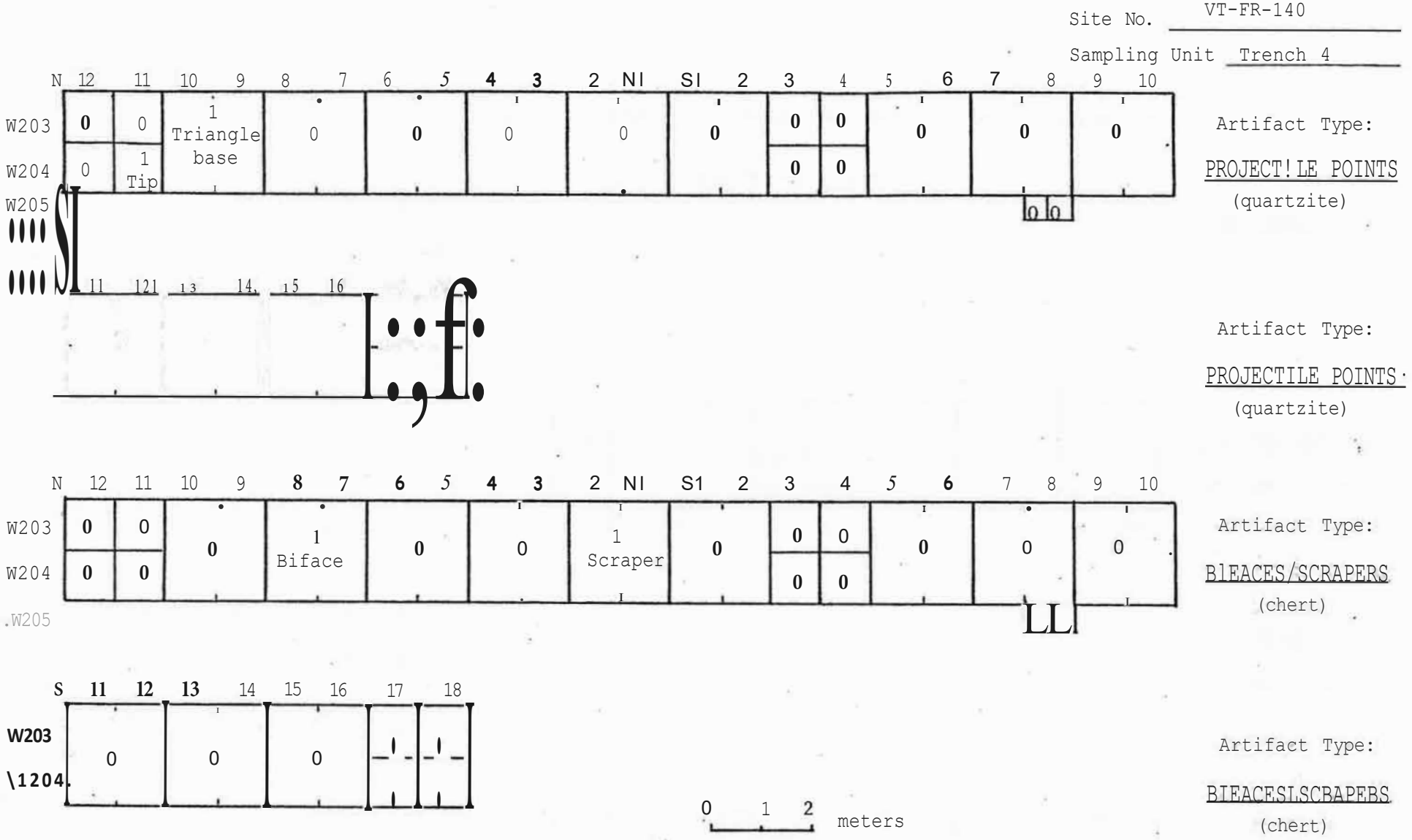


Figure. 38. Distributions of Projectile Points, Bifaces and Scrapers, VT-FR-140, Trench 4.

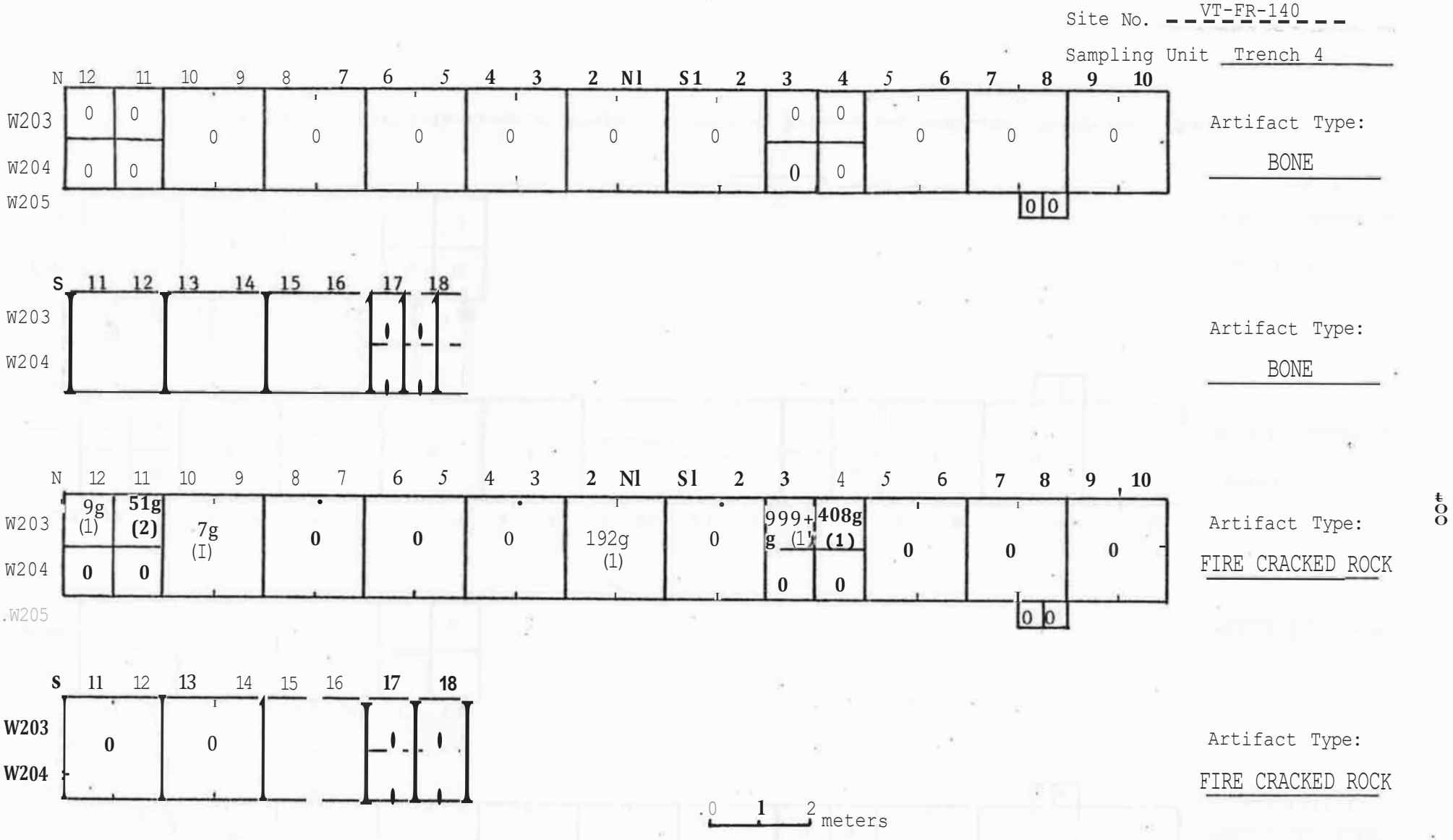
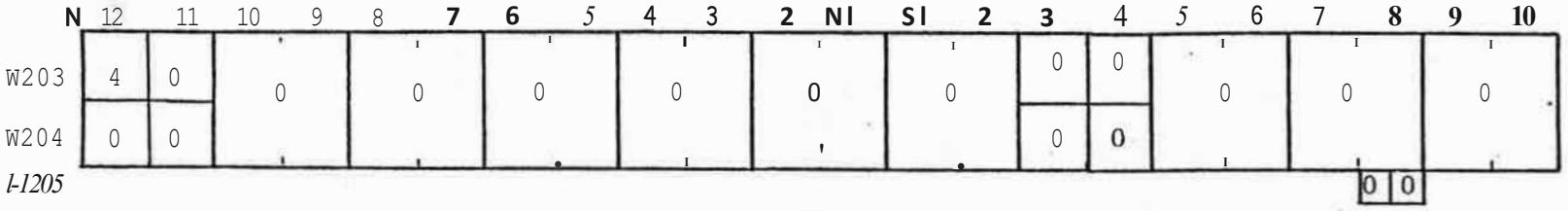


Figure 39. Distributions of Bone and Fire Cracked Rock, VT-FR-140, Trench 4.

Site No. VT-FR-140

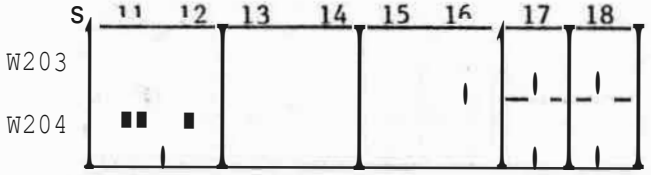
Sampling Unit Trench 4



Artifact Type:

HISTORIC POTTERY

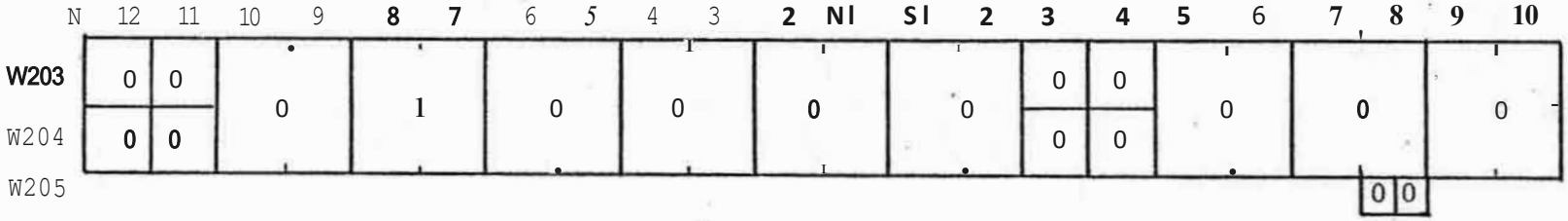
(whiteware)



Artifact Type:

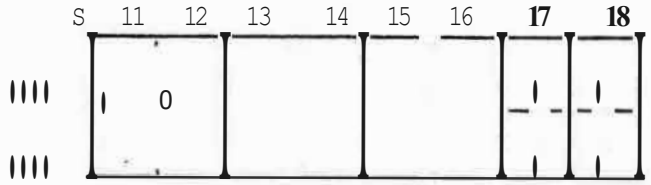
HISTORIC POTTERY.

(whiteware)



Artifact Type:

NAIL., SQUARE



Artifact Type:

NAIL., SQUARE

0 1 meters

Figure 40. Distributions of Historic Artifacts, VT-FR-140, Trench 4.

Figrue 41. Identified Bones Recovered at VT-FR-140.

Testing Area/ Sampling Unit	Catalog No.	Species	Bone Description
Trench 1			
N58E47	366	Deer	Metapodial, proximal end
N60E48NE	548	Probably deer	Long bone frag
N60E48NE	632-3	Large mammal, possibly deer	Shaft frags
N60E48NE	632-4	Large mammi.al, possibly deer	Shaft frags
Trench 2			
S15W79	113	Woodchuck?	Long bone frag
S16W79	106	Large mammal	Rib, articular frag (twice as large as deer)
S16W80	104	Deer	2nd phalange, proximal end
S20W80	147	Bear	Phalange, proximal end
S33W80	120	Deer	2nd phalange, proximal end
Adjacent to Trench 2			
S44W74NW	267-1	Deer	Metatarsal frag
S44W74NW	271	Deer	Humerus, proximal end
S44W74SW	274-3	Deer	Tooth fragments
S44W74NW	285-2	Deer	Probably metatarsal frag
S47W131NE	307-1	Deer	1st phalange, distal end
S47W131SW	310	Large mammal, deer range Medium size mammal	Long bone shaft Skull
S47W132NW	316-1	Deer	Probable 3rd phalange
S47W132SE	327	Deer? Squirrel range	Scapula frag Jaw frag
S47W132SE	327-1	Deer	Vertebrae; many shaft frags
S47W132SW	324	Deer	Sesamoid; probable phalange frag
S48W131	228	Beaver	Incisor root
S48W131NE	294-1	Deer	Probable metapodial frag
S48W131NE	294-2	Deer	Tooth frags
S48W131NW	290	?	Possible scapula frag
S48W131NW	290-1	Deer	Tooth frags
S48W131SE	299	Deer	Long bone frags; metapodial frag

(continued)

Figure 41 (continued). Identified Bone Recovered at VT-FR-140.

Testing Area/ Sampling Unit	Catalog No.	Species	Bone Description
Feature 7			
S48W132	328-6	Possibly dog	Tooth root
"	328-5	Deer	Terminal phalange (large deer); 2nd phalange, distal and proximal end
		Possibly bear	Probable 1st phalange
		Raccoon range	Shaft frags
		Dog/fox/racoon range	6 tooth root cones
		Medium size mammal	1 scapula frag
"	333-3	?	Tooth root
"	334	Deer	Tooth frags
"	334-5	?	Tooth roots
"	341	Deer	3 large metapodial frags
		Medium size mammal	?
"	341-1	Deer	Metapodial, distal end; 1st and 2nd phalanges, distal and proximal frags
		Medium size mammal	Skull frag
"	342	Probably beaver	Probable scapula frags (2)
"	342-1	Medium size mammal	Skull frag
"	342-2	Deer	Tooth frags
"	344-4	Deer	Tarsal and metatarsal frags
"	344-5	Deer	Metapodial frags
		Medium size mammal	?
"	345-4	Deer	Carpal
"	345-5	Deer?	Shaft frags
		Medium size mammal	Shaft frags
S48W132	359	Medium size mammal	Skull frag
S48W132	359-1	Deer	Tooth frags
S48W132NW	227	Deer	Tooth £rags
S48W132NW	250-7	Very young deer	Possible 3rd phalange
S48W132NW	250-8	Deer (young)	Tooth £rags

((:.ontinued)

Figure 41 (continued). Identified Bone Recovered at VT-FR-140.

Testing Area/ Sampling Unit	Catalog No.	Species	Bone Description
S48W132SE	247-4	Deer (mature) Deer (fetal) Deer range	1 styleform, head 1 3rd phalange Skull frag; long bone shaft frags
S48W132SW	242-3	Deer	1 tarsal frag, 1 phalange frag
S48W132SW	244-1	Deer ?	Possible radius frag Long bone frags; tooth root
S56W132	254	Beaver	2 scapula frags; 3 radius frags; tooth
TP 72 Ext NE	513-5	?	Shaft frags
"	516-2	Medium size mammal	Rib frag
"	518-3	?	Shaft frags
"	521-3	Deer	Probable sesamoid
"	598-2	Rabbit	Molar
"	602-4	Deer	2nd phalange, proximal end
"	606-4	Deer	3rd phalange
"	609-3	Possibly deer	Metapodial frag
TP 72 Ext NW	510-5	Bear? Deer	Probable humerus, distal epiphysis Sesamoid
"	510-6	Medium size mammal	Small pieces shaft frags
"	593-2	Possible squirrel	Claw cone
"	594-5	Woodchuck/ raccoon range	Humerus, proximal epiphysis
TP 72 Ext SE	537-1	Medium size mammal	Skull frag
TP 72 Ext SW	494-9	Deer Probable deer	Sesamoid Long bone shaft
"	546-4	Medium size mammal Medium and large mammal	Skull frag Shaft frags
"	546-7	Possibly squirrel	Vertebral centrum; phalange; and skull frag
"	615-3	Deer	3rd phalange

southern end, over 200 bone fragments were recovered, particularly from Feature 3 in S44W74. The absence of any bone only two meters away in S42W74 (see Figure 35) indicates that such refuse is tightly clustered around this hearth. The use of 1/8" mesh screens accounted for over 90% of the sample which would have been lost through½;" mesh screens. Identifications were possible on only a few bones (see Figure 41). These include fragments of deer humerus and metatarsal, as well as teeth. Many of the smaller pieces of bone are broken elements of long bone shafts from a large animal, probably deer. Within the sample, however, the thinness of some bones suggests that they are derived from a small-medium sized mannnal. Fish, turtle and nut shells are not present, even in the flotation samples which were run through 1mm mesh sieves.

S47Wl31/132 (Feature 7):

A skeletal analysis of over 1000 bone fragments recovered from a hearth (Feature 7) and adjacent area within this 2 x 2m unit indicates that a range of animals were hunted or trapped by the site's occupants (see Figure 41). A small portion of jaw is probably derived from squirrel. Meaium-sized mammals are represented by skull, scapula and leg bone fragments; seven toothroots of a carnivorous mammal suggest dog, fox or raccoon. Beaver is represented by an incisor and probably by a piece of scapula. Bear is probably represented by a section of first phalange (toe bone). No fish or turtle bone was identified, nor were nut shells, in the flotation samples.

As is typical of all of the features at VT-FR-140, deer bone is most conunonly encountered. Twenty-two examples were identified. Carpal and tarsal bones, metapodials, a sesamoid, a styliform, and pieces of the first, second and third phalanges make up most of the sample. These are all bones of the lower legs. Small pieces of burned long bone occur throughout the hearth area. Teeth are represented by 203 pieces of enamel. This quantity may not, however, represent many individual teeth. Two lower molars were found in situ in the hearth, but these broke into 25 pieces when removed. Of particular interest is the presence of a small piece of deer vertebrae, two possible scapula fragments and a possible portion of radius. This is the first instance in which other than lower leg bones of deer seem to have been identified in a hearth dating from the Middle Woodland period, either at VT-FR-134, 104 or 140. It is unclear, however, what this pattern indicates. The inclusion of other portions of one or more deer carcasses with the lower leg bones may have been intentional. On the other hand, if several animals were butchered and consumed on site, then the inclusion of such bones may be due to the random scattering of bones around the camp site, with a few making it into a hearth. If the latter case is correct, an extended period of site occupation might be indicated.

An argument for extended residence is reasonable on other grounds. First, third phalanges (bones which form the cone of the hoof) of three different sizes were recovered. One is from a mature indi·.ridual, one from a subadult deer, and one is either a fetal specimen or in the one-two month age range. Thus, one or more hunting forays are probably involved. Second, the hearth is large (about 1.5m in diameter), but contains distinct smaller depressions which are likely to represent the building of sequential fires. The presence of fetal or very young deer also indicates that at least a spring-

early summer period of occupation is represented. The duration of residence, the size of the residential group, etc. cannot be determined without further exploration.

S56W131/132 :

Eleven bone fragments and one tooth were recovered in this 1 x 2m unit. All identified pieces (2 scapula, 3 radius fragments and 1 incisor) suggest that a single beaver is represented. None of the bone was burned. This factor, in conjuction with the location of the bones near the present river bank, probably indicates a non-cultural association for the skeletal remains.

Trench 4:

Only one fragment of bone was recovered in an area of approximately 60m2 (see Figure 39). This low density, when compared to other areas, may well be due to the fact that only¼" mesh screens were used and that only 50-70% of the soil in the plowzone was sifted. A more thorough excavation technique might produce different results, or, conversely, the apparent low density might be real.

High Terrace-Eastern Portion

This portion of VT-FR-140 was sampled with a N-S trending, 22m-long trench--Trench 1--as well as with an additional 2 x 2m test unit at the southern end of the trench and with twenty-six 50cm test pits placed at 4m intervals along three parallel transects which were offset from each other by 4m. Adjacent areas to the north and west were intersected by test pits associated with Transects 5 and 6 (see Figure 29). The distributions of various artifact classes recovered from Trench 1 and from the test pit transects are presented in Figures 42-49. Composite artifact inventories and cultural features are listed below by sampling units.

Trench 1 and adjacent 2 x 2m unit (N56/78E47/48; N55/56E48/49)

1 cultural feature:

Feature 12-- an apparent hearth exposed in the east wall of the trench (N60E48) by the backhoe. None of the surface area has been exposed so that its horizontal dimensions are unknown. Vertically, it is characterized as a shallow (15cm) depression which is visible from the base of the plowzone and extends into the B horizon. The fill is intensely oxidized, strong brown in color (7.5YR5/8), contains virtually no charcoal but does contain small pieces of calcined bone. A generally thinner, but equally intensive oxidized band extends for about 1.5 m to either side of the presumed hearth (see Figure 7). It is hypothesized that this strong brown band identifies the location of a shelter which burned, thus oxidizing the soil below.

1 large chopping tool (Plate IV; 4)
1 flaked celt blank (Plate IV: 1)
2 hammerstones (Plate IV: 2)
6 chert biface fragments (Plate IV: 3)
1 chert scraper
4 utilized flake tools
2140 chert flakes
52 quartz flakes
38 quartz fragments
2 quartzite flakes

Transects East of Trench 1: TP 8/8-1 to 1; Transects 7 and 8

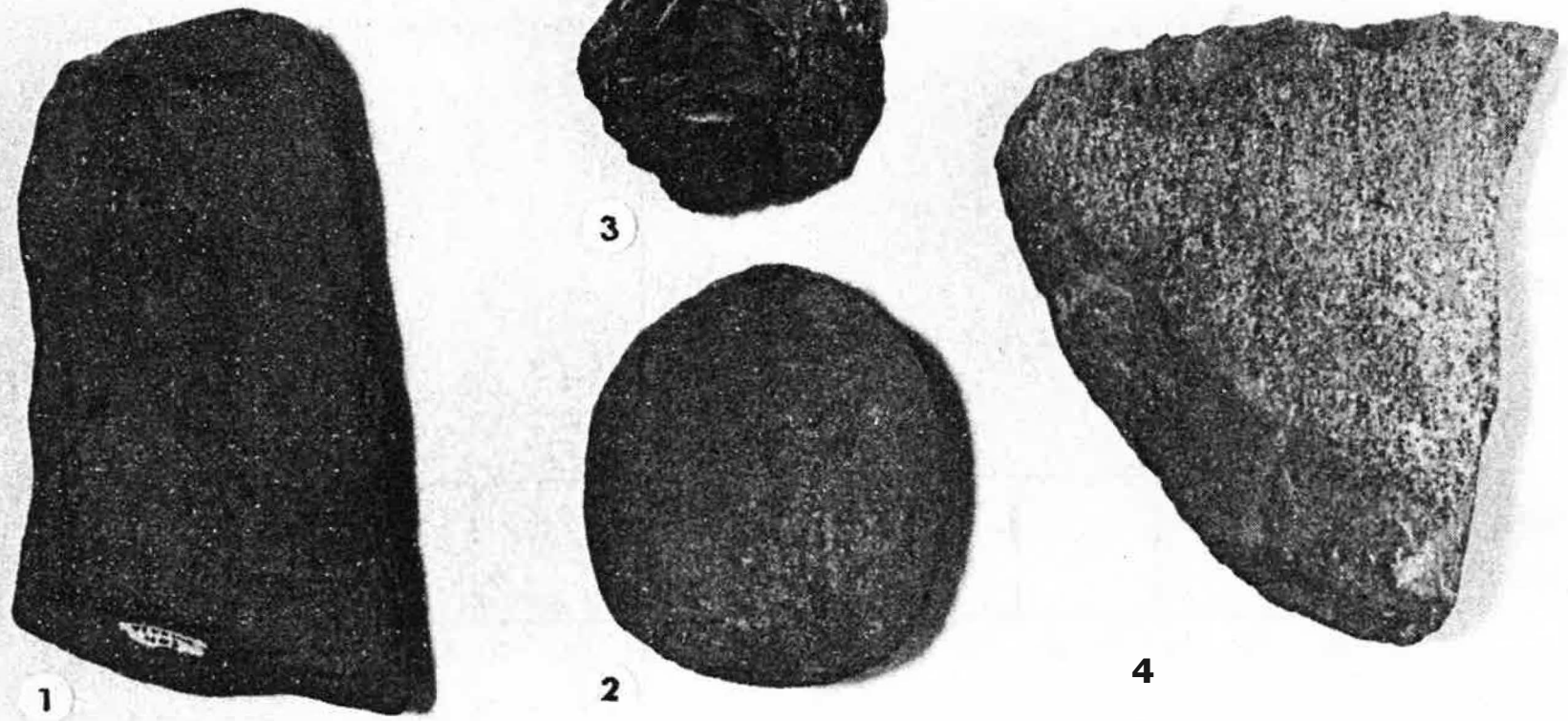
1 utilized chert flake
126 chert flakes
9 quartzite flakes
15 quartz flakes or blocky fragments
1 piece of bone
17 pieces of fire cracked rock

Test Pits North and West of Trench 1: Transect 6--TP14, 16 Transect 5--TP14

2 chert flakes (Transect 5--TP14)
3 fire cracked rock fragments (Transect 6--TP14)
1 quartz cobble (Transect 6--TP16)

Limited sampling at this site has defined a number of its archaeological characteristics. 1) The distributional patterns of various artifact classes evident in Figures 42-49 indicate that this portion of the high terrace was the site of fairly intensive prehistoric activity. 2) Aside from a few scattered items to the north and west of Trench 1, there is an apparent tendency for artifacts to cluster in a roughly 40 x 10m portion of the terrace, with the longer axis running parallel to the river channel. 3) Artifacts were recovered here in both a plowzone and a subplowzone context, but only one cultural component is present. The varying artifact depths are the result of accumulative downslope wash from the crest of the terrace. Where soil has been lost towards the terrace crest, artifacts have been incorporated into a modern plowzone. Where soil has been redeposited downslope along the edge of the terrace, artifacts are buried up to 65cm, some 30-40cm below the plowzone. Artifacts at intermediate depths along the slope are also present. 4) Although insects and roots have been active in disrupting the upper 70cm of the terrace soils, sampling indicates that the horizontal displacement of artifacts has been minimal. These characteristics all suggest that the clarity and integrity of the archaeological deposits are sufficiently good to allow meaningful interpretations to be made.

A number of specific cultural activities can be inferred from the horizontally clustered distributions of artifacts which were encountered. A striking concentration of chert flakes occurred in a single 2 x 2m unit (N55/56W48/49) at the southern end of Trench 1. Here, 1,923 flakes were located using¼" mesh screens (see Figure 42). Outside of this 2 x 2m unit



VT- Fr• 140

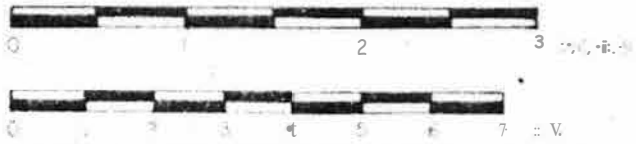


Plate IV

1. Roughed out blank for celt (#403): N6E48
2. Hammer tone (#426): N66E48
3. **Chert** biface base (//562): N55E48
4. Chopping tool produced from a large cobble spall (486-1): N56E49

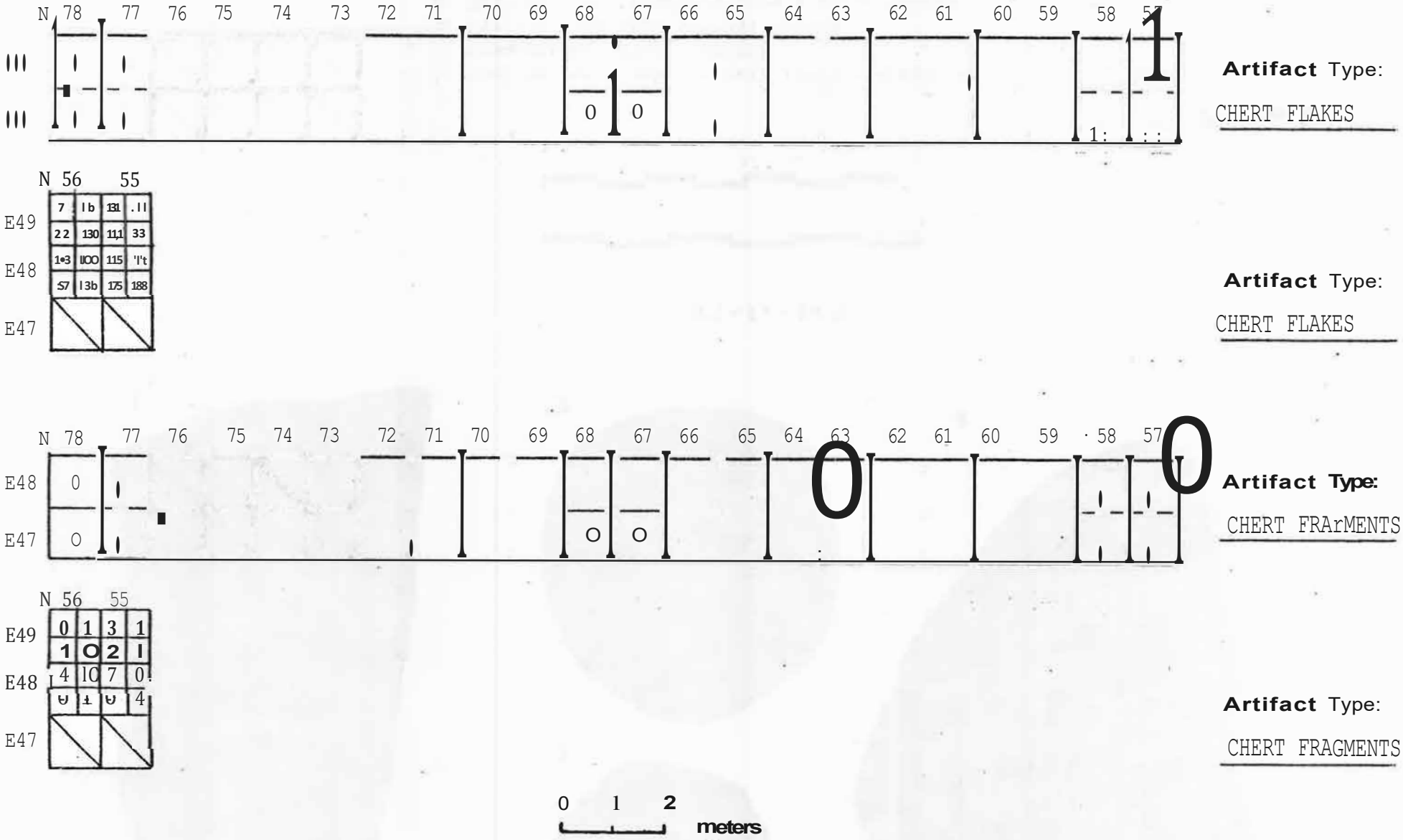


Figure 42. Distributions of Chert Flakes and Fragments: VT-FR-140, Trench 1.

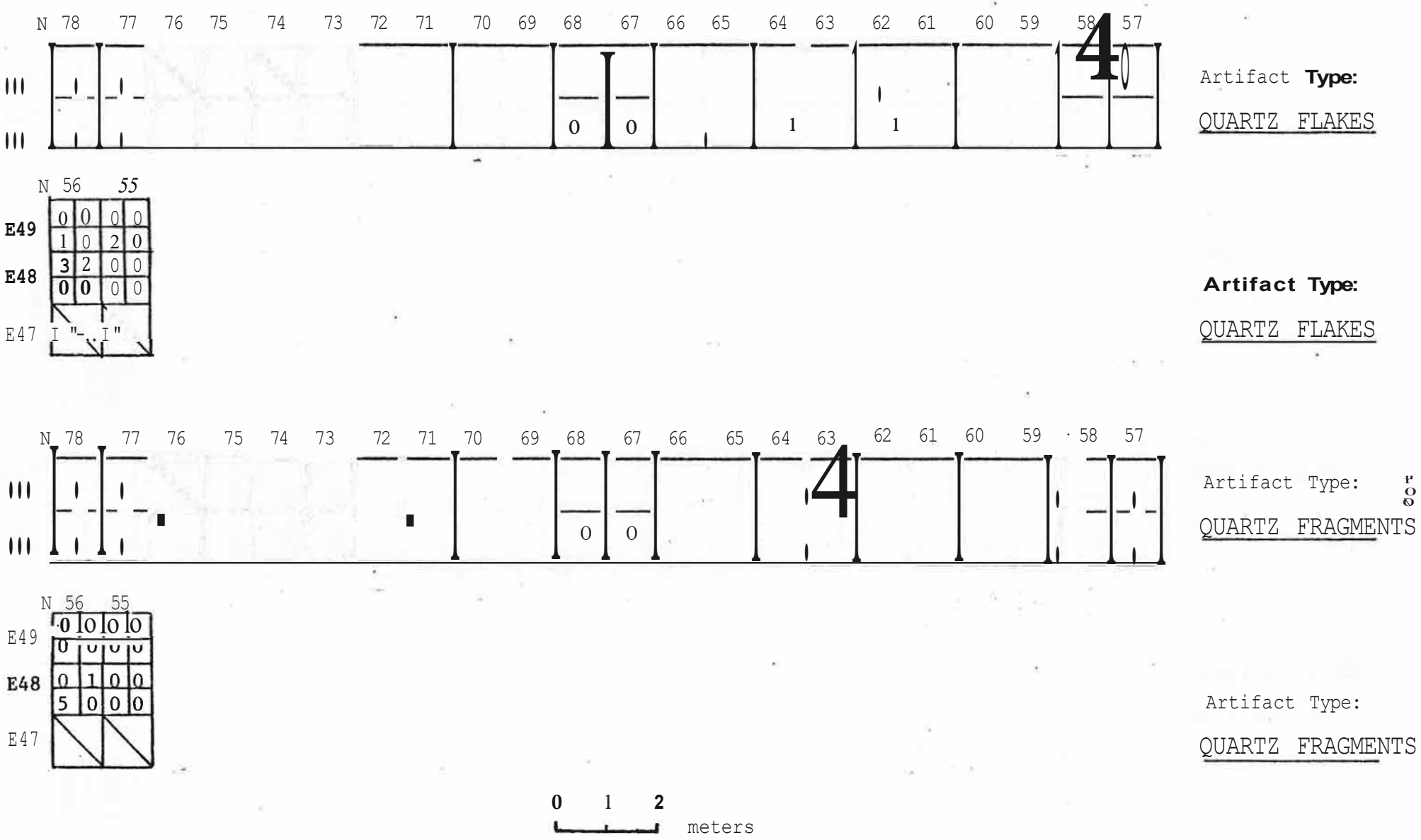


Figure 43. Distributions of Quartz Flakes and Fragments: VT-FR-140, Trench 1.

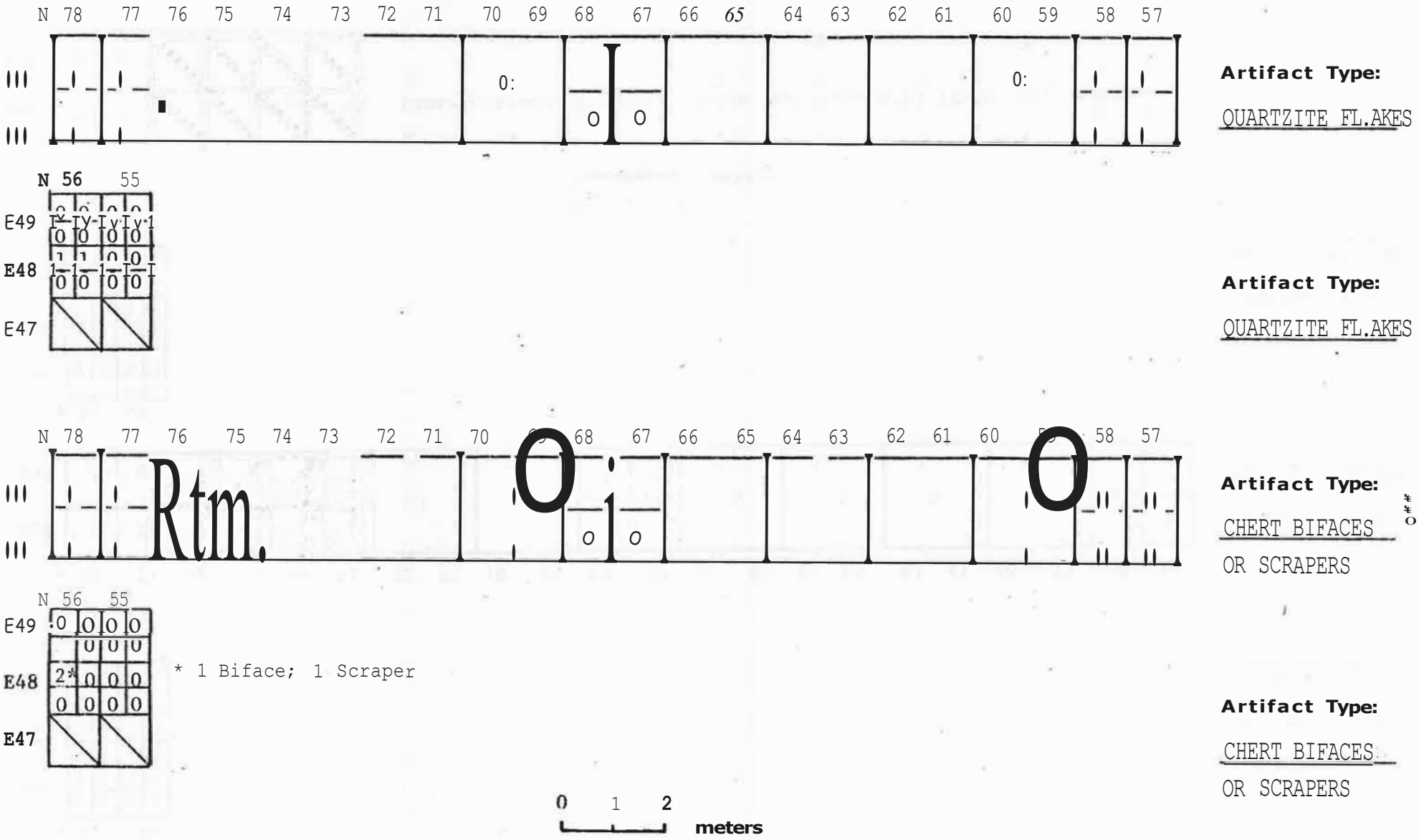


Figure 44. Distributions of Quartzite Flakes and Chert Bifaces and Scrapers: VT-FR-140, Trench 1.

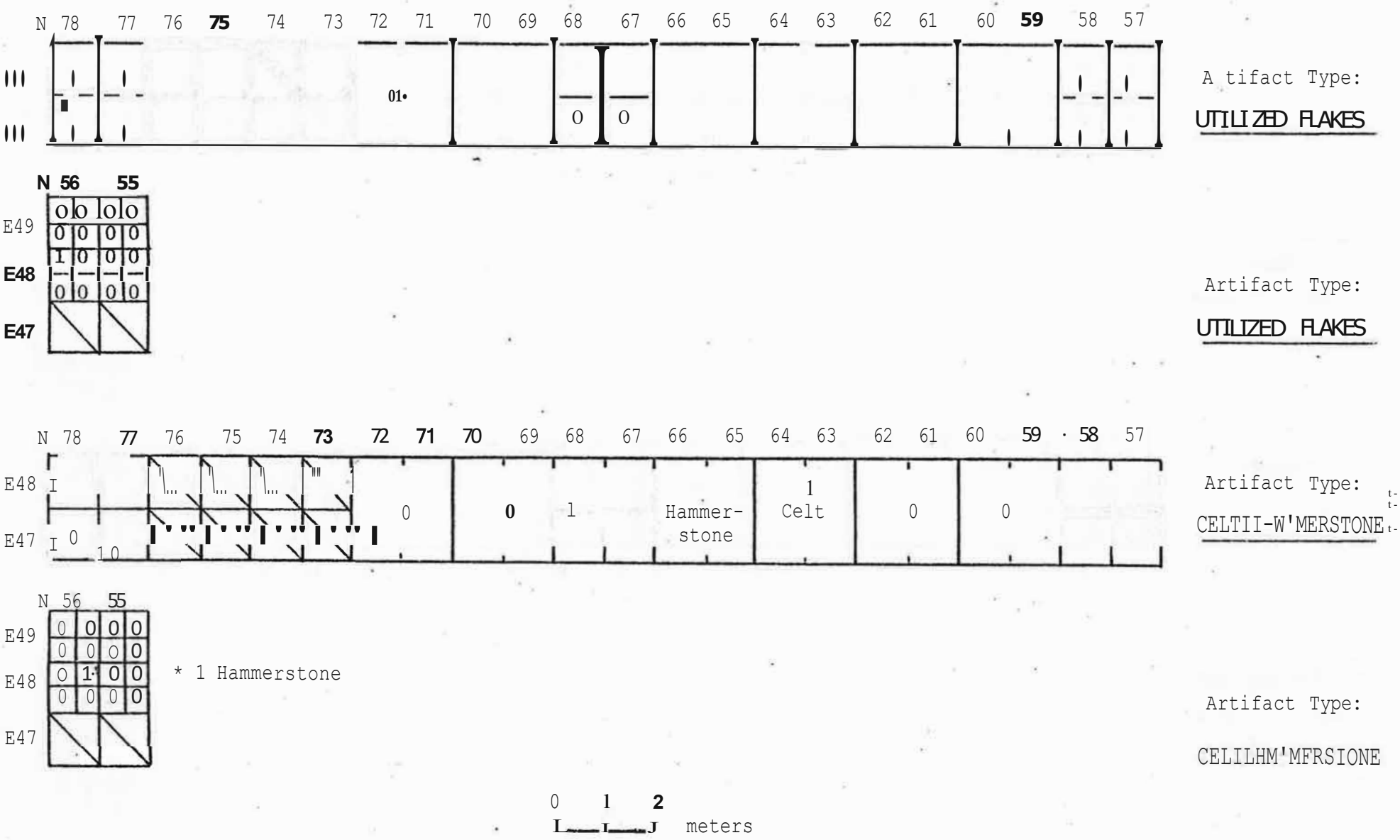


Figure 45. Distributions of Utilized Flakes, Celts and Harnmerstones: VT-FR-140, Trench 1.

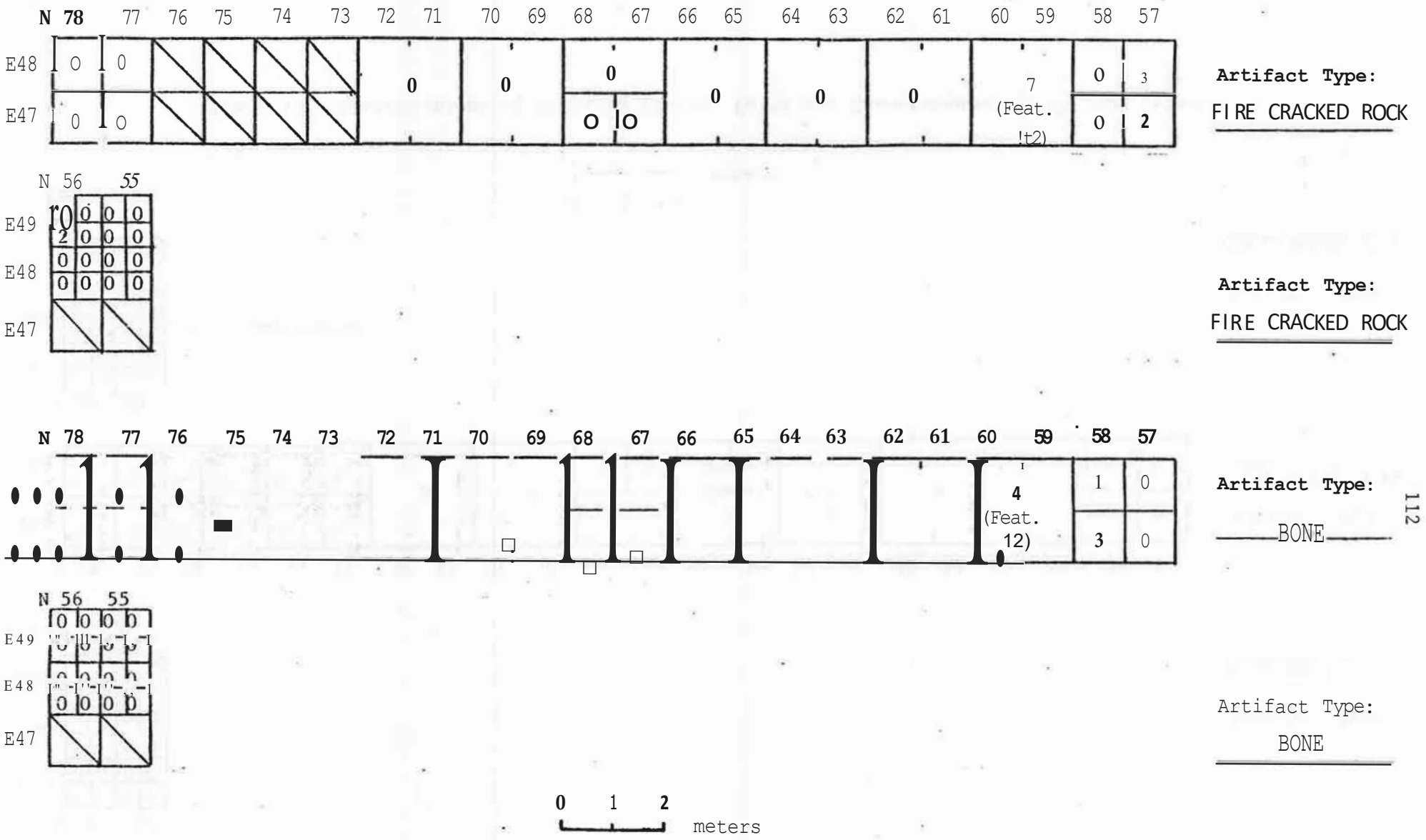
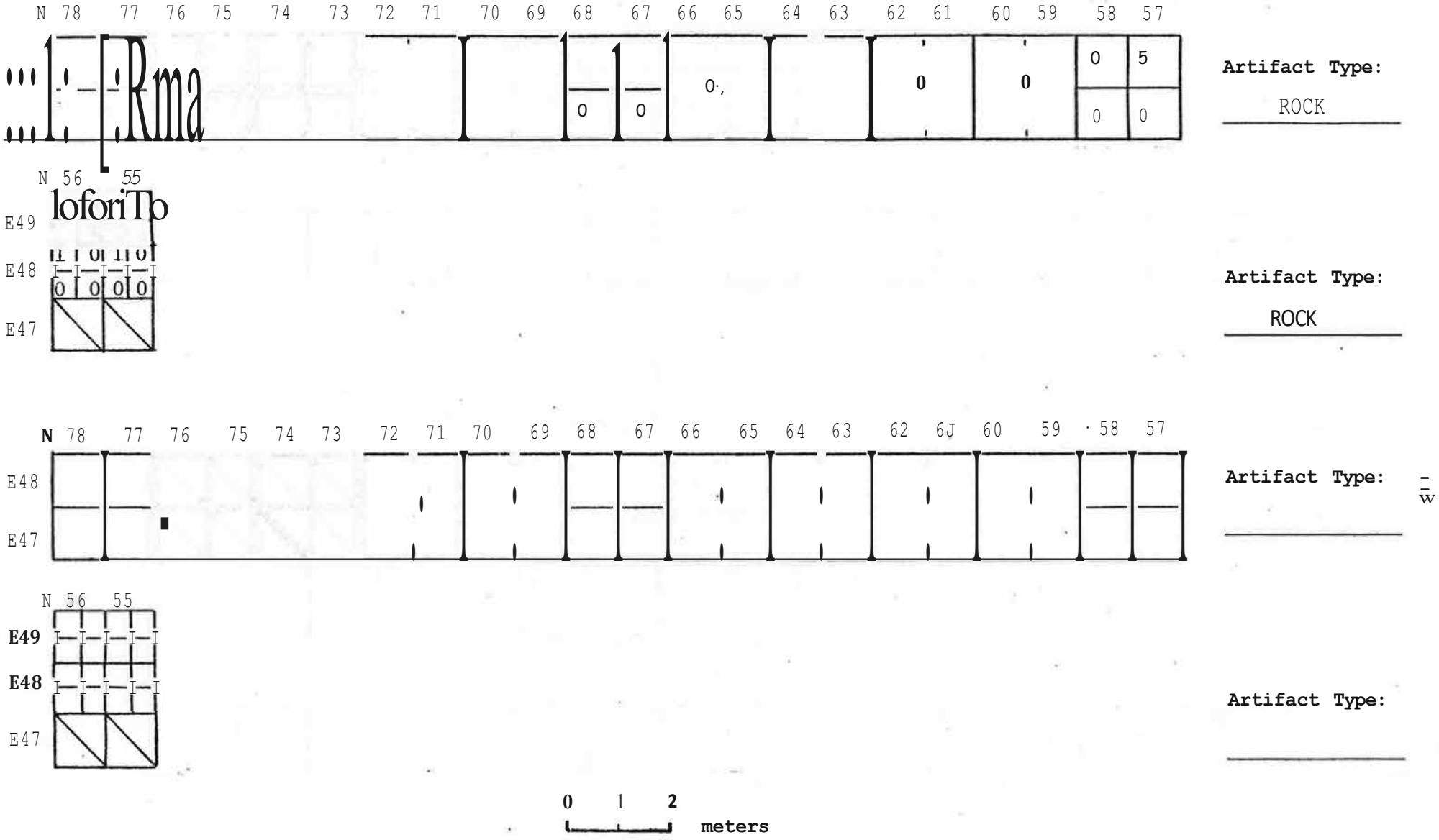


Figure 46. Distributions of Fire Cracked Rock and Bone: VT-FR-140, Trench 1.



F:i.gure 47. **Distributions of Rocks: VT-FR-llf0, Trench** 1.

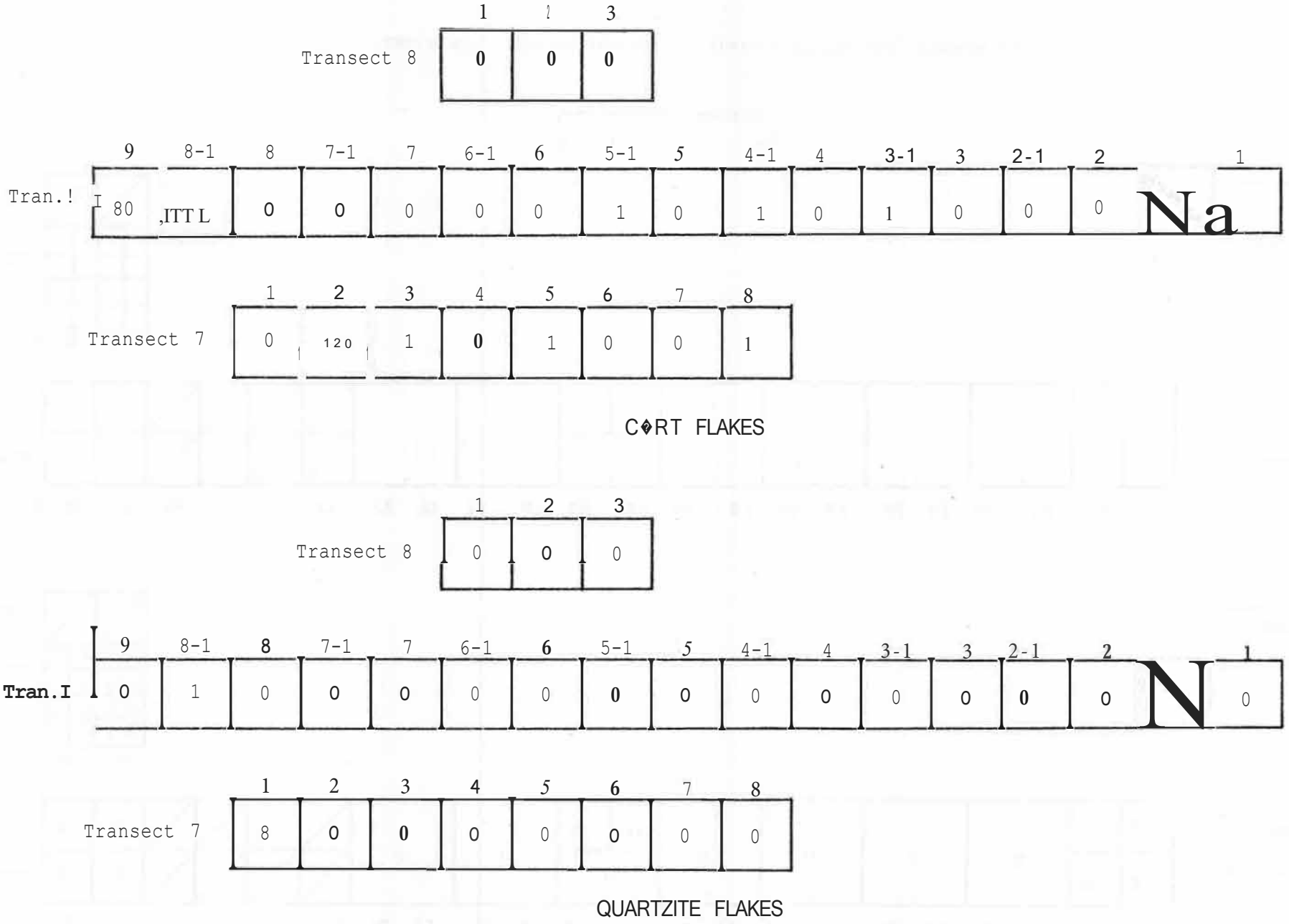


Figure 48. Distributions of Chert and Quartzite Flakes, Transects East of Trench 1, VT-FR-140.

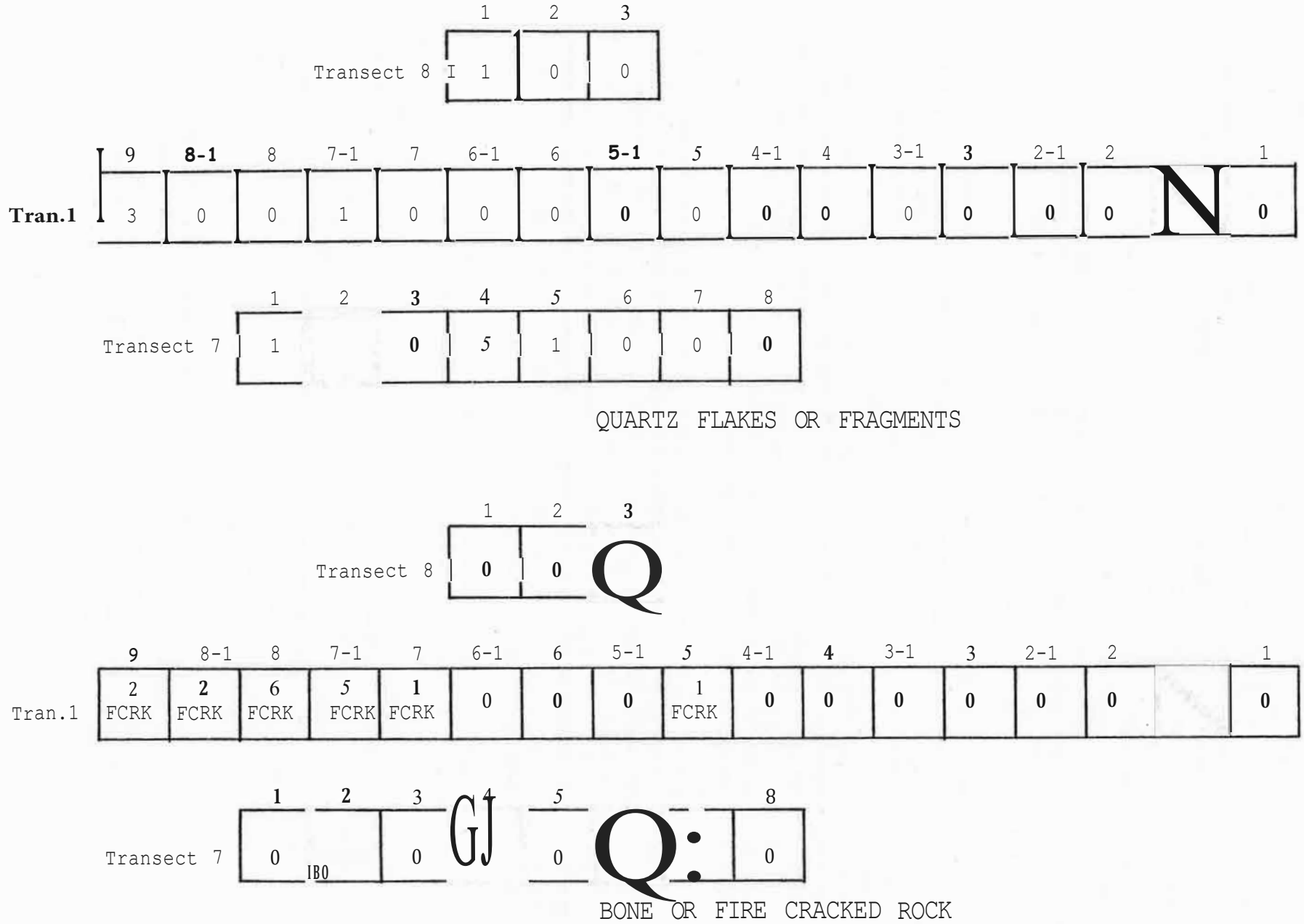


Figure 49. Distributions of Quartz Flakes, Bone, and Fire Cracked Rock, Transects East of Trench 1, VT-FR-140.

the frequency of chert flakes drops off rapidly. In the adjacent 2 x 2m unit in Trench 1 (N57/58E47/48), 210 flakes were found in the southern half, while only 20 were recovered from the northern half. Beyond this, the quantity of chert flakes in any 2 x 2m unit in Trench 1 is never more than 9. The dense concentration of chert flakes is spatially associated with 56 fragments of chert cobbles, 6 biface fragments (i.e. a core showing bifacial reduction before the intended blade was broken), a harrnnerstone (N56E48), 4 utilized flake tools (N57E48 and N56E48) and 10 cobbles which may have been collected as potential raw material or for breaking other cobbles. Taken together, this cluster of flakes and other artifacts definesa lithic workshop at which the production of large blades or preforms was undertaken. Several large bifaces which have enough of their thinned edges to project their general outlines suggest that a lanceolate or ovoid blade form was being sought.

Because N55/56E48/49--the center of the workshop--was excavated in 50 x 50 em blocks, it is possible to see quantitative changes within the 2 x 2m unit (see Figure 42). The internal distribution by quantities of chert flakes suggests that the reduction of individual cobbles (cores) may be detectable by plotting density contours. The highest frequency in any 50cm block occurs in N56E48SE, with a decrease in quantity on all sides. Increasing densities in N55E48SW and N55E49NE suggest additional peaks to the south and east beyond the 2 x 2m unit. Areas where blades or preforms were reduced to their final form may certainly exist in close proximity. Such an area might be located some 10m to the northeast where TP2 in. Transect 7 uncovered an additional 120 chert flakes.

The use of quartzite as a raw material for tool production was apparently infrequent. Only 11 quartzite flakes were recovered from the 1980 and 1982 sampling units combined. Quartz flakes occur in somewhat greater abundance, but their distributional peak--N60/64E47/48 in Trench 1--is not related to the chert workshop. Although the general pattern is diffuse, the recovery of 8 quartz cobble fragments, in conjunction with the flakes, does suggest that a few quartz cobbles were tested or partially reduced to evaluate their workability for tool manufacture.

Four small pieces of burned bone were recovered from Feature 12 which was exposed in the wall of Trench 1 by the backhoe (N60E48). Although it contained virtually no charcoal, it is believed that this heavily oxidized depression represents the renmants of a hearth. Four additional pieces of calcined bone were encountered in close proximity to the feature in N58E47/48. In the trench, this bone distribution overlaps with the highest density (n= 7) of fire cracked rock. Together, this pattern suggests that part of a cooking area has been encountered. The presence of fire cracked rock in test pits irrnnediately to the east of Trench 1 (TP8-1, 8, 7-1 and 7), as well as a piece of burned bone (Transect 7, TP2) makes it likely that a general cooking area extends over some 12m.

Of the bone which was recovered, only one piece could be definitely identified as to species. This fragment was from the proximal end of a deer metapodial (lower leg). The remaining pieces are derived from broken leg bones of a large animal and could certainly be from a deer as well. It is of interest that all bones recovered on this high terrace are heavily weathered.

Rather than the sharp angles which characterize the edges of most leg bone fragments recovered on the low flood plain, edges here are rounded and the bone is softer. This weathering may indicate that the localized soil conditions are more acidic than on the low flood plain; this weathering may also indicate a greater age of this bone.

Although no temporally diagnostic artifacts were recovered, a number of factors indicate that this site is considerably older than the Middle-Late Woodland period sites which have been encountered repeatedly throughout the Archaeological District. First, the large ovoid or lanceolate blade form recovered from the chert workshop is strikingly different from the small triangular preforms typical of the Woodland period. In fact, such ovoid forms match quite closely forms recovered from Early-to-Middle Archaic sites in New England. Second, there is a total lack of pottery from this high terrace. Third, the presence of a flaked blank for a celt, a large crude chopping tool and a heavily pitted hammerstone (see Plate IV) are all items which have not been recovered at any sampled Middle-Late Woodland site in the District. Fourth, the virtual absence of charcoal in the hearth suggests that sufficient time has elapsed from the time of use for the charcoal to have decayed into very fine pieces and been dispersed by bioturbation. Fifth, given the fairly gentle slope of the terrace, considerable time would have been required for downslope wash to have had a noticeable effect on the soil profile, yet in the workshop (N55/56E48/49) the quantitative peak for chert flakes occurs between 40-60cm below ground surface. Sixth, as noted, the bone is considerably weathered. Seventh, the geomorphology of the high terrace, inconjuction with a date of 8090 ± 110 B.P. from the base of a structurally similar sequence in Trench 4-Extension, indicates that this terrace has been available for occupation for 8,000-9,000 years.

One the basis of the sample collected to date, it is extremely probable that this occupation/activity area dates to the Archaic period and that an age of 5,000-8,000 years is likely. Functionally the site appears to have acted as a residential base from which at least deer hunting was carried out. It was noted above that a 3-4m wide (N58/62E48), heavily oxidized band was exposed in the wall of Trench 1. It extends to either side of a hearth in N60E48 (see Figure 7). It is hypothesized that this oxidized band identifies the location of a shelter which burned, thus producing a locally oxidized area from the heat produced. If so, and if a 3-4m diameter cross-section of a shelter exposed in the trench wall is typical of the shelter's width, then the residential group using this shelter is likely to have been fairly small as well. Given the 10 x 40m site area, however, several shelters could be present. At this time, the evidence is lacking to test these inferences. What should be noted is that if such a shelter could be exposed, this would be a unique event in Vermont's Archaic period archaeological record.

High Terrace--Central Portion

This area stretches roughly 250-300m E-W along a fairly flat, topographic ridge to the north of the low flood plain and west of the archaeological site identified at the eastern end of this terrace. Structurally, from east to west, this landform is composed of the same alluvial sequences of very

fine sand and silt beds that were deposited as overbank sediments. A log recovired from the base of Trench 4-Extension was radiocarbon dated to 8090 - 110 B.P.--a date which is probably close to the end of this depositional sequence. Thus, this landforrn is likely to have existed for the past 7,500 years.

Evidence of archaeological deposits was first encountered here in 1980 when four clusters, each containing five test pits, were used to determine the presence or absence of cultural deposits. Of the twenty test pits, five proved to be culturally positive (see Figure 28). Although the density of artifacts was low, except for TP83, the intensity of sampling was also minimal--.00005%. The level of sampling during the 1982 field season did not improve substantially, but because some of the large horizontal gaps along portions of this ridge have now been filled in, it can at least be said that large sites are unlikely to be present.

In order to determine the presence or absence of additional areas of prehistoric cultural activity, four transects containing 50cnr test pits placed at 8m intervals were excavated from east to west across portions of the ridge (see Figure 29). In all, 56 test pits were excavated. Trench 2-Extension and Trench 4-Extension were used to evaluate the geomorphology of the ridge and the backdirt from three 2 x 2m units within Trench 4-Extension was partially screened for cultural artifacts. A 1 x 2m unit in Trench 2-Extension was dug when a 50cm test pit exposed several flakes. Finally, during the 1980 survey thirty-eight quartzite flakes had been recovered from TP83 and it was assumed that an area where projectile points had been manufactured had been located. In an attempt to recover a temporally diagnostic artifact, TP83 was expanded by 4m2. The following artifacts were recovered within various portions of the ridge:

Transect 6 (eastern portion):

Nothing was recovered until TP14 and 16 near the site at the eastern end of the terrace (3 fire cracked rocks; 1 quartz cobble).

Transect 5 (eastern portion):

Nothing was recovered until TP14 adjacent to the site at the eastern end of the terrace (2 chert flakes).

Transect 4 (north-central portion):

Test Pit 3--1 chert flake
Test Pit 5--1 quartzite flake

1 x 2m Unit in Trench 2-Extension (central portion)

3 chert flakes
9 quartz flakes
3 quartz fragments

N45W80 (central portion just south of Trench 2-Extension)

13 quartz flakes

TP83 and N44W156/157, N45W155/156 (west-central portion):

101 quartzite flakes tightly clustered in a 1 x 1 m unit--N44W157 (38 of these flakes are from TP83)

Trench 4-Extension (western portion):

No cultural artifacts or features were found.

At this point, determining the potential significance of the cultural deposits which are now known to be located along this ridge is impossible. Prehistoric artifacts were encountered in hine, small, dispersed test pits in an area of roughly 7,500 m^2 (787,000 ft^2); in some cases test pits only Sm away contained no artifacts. Aside from these two factors, no spatial information about artifact distributions has been obtained. Although the landform which underlies these artifacts is old, the age of the sites is unknown. The one characteristic which does suggest that they are likely to date to a pre-Woodland period is that artifacts are connnonly found at depths of 30-50cm below the surface--TP83, Transect 4: TP3, N45W80, N65W80). This factor also makes it clear that sites which are located here have not been disrupted by modern plowing. In sum, although a low intensity sample has identified artifacts in n""ib:esubareas that are likely to date from the Archaic period (i.e., pre-4000 B.P.) and that have not been disturbed by plowing, their significance, either collectively or as individual sites, cannot be adequately evaluated without further testing in the areas immediately surrounding each of the positive test pits.

Terrace--Western Edge:

During 1980, a small level area adjacent to the river at the far western edge of Tract 28 was tested with a cluster of five test pits (see the cluster designated by TP68 in Figure 28). All test pits proved positive, with the additional characteristic that all items were found in an unplowed context. In TP72 at the western edge, an apparent hearth was also encountered. In order to confirm the site's structural integrity and to gain information about the site's age and possible function, a 2 x 2m unit was excavated adjacent to TP72. This unit was designated TP72-Extension. Artifact distributions and the location of Feature 10, a shallow hearth, are presented in Figures 50-55. For the northern half of the 2 x 2m unit, distributions are by 25cm blocks. The A horizon (0-15cm) and the top of the B horizon (16-25cm) were removed as separate vertical units, thus the notations Level 1 and Level 2 in Figures 50-55. An artifact inventory and a brief feature description are provided below.

Test Pit 72-Extension:

1 cultural feature:
Feature 10--a shallow surface hearth which was encountered just below the A horizon in the center of this 2 x 2m unit. The exact outline of the hearth's edge has been obscured by insect and root activity, but the center is characterized by intense oxidation and a concentration of burned bone. Scattered charcoal occurs

throughout the 2 x 2m unit, but the existence of burned tree roots makes it impossible to determine whether most of this charcoal is derived from the hearth or is due to natural burning.

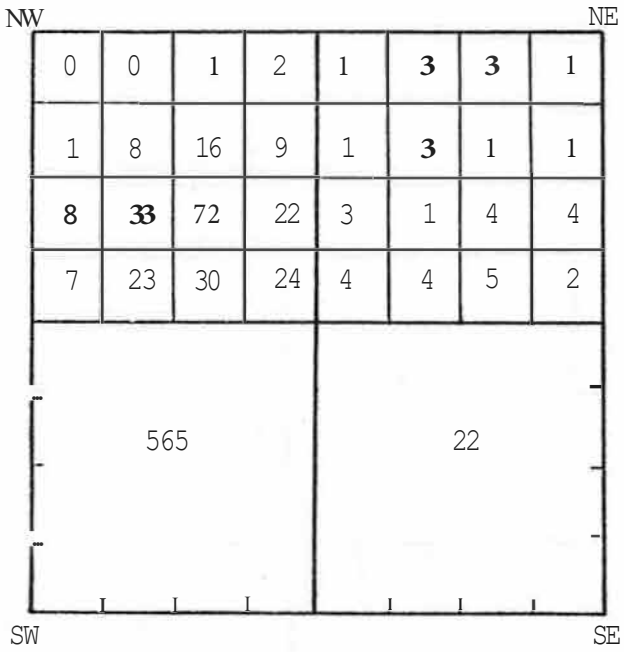
1 quartzite Levanna projectile point base (Plate III: 12)
1 chert triangular preform (Plate III: 14)
2 chert biface fragments (Plate III: 13)
1 combination tool: chert drill and scraper (Plate III: 10)
1 chert scraper
1,249 chert flakes
268 quartzite flakes
12 quartz flakes
92 small pieces of pottery (primarily from Feature 10)
4 pieces of graphite
ca.1000 pieces of burned bone
363 small fragments of fire cracked rock

The level terrace within which TP 72-Extension was placed contains approximately 576m^2. For this reason, an interpretation of the site's function which is based on the excavation of only 4m^2 (a .7% sample) is premature. However, a number of specific characteristics of the site can be defined. 1) The recovery of the base of a Levanna projectile point and a triangular preform indicate that this site dates from a period between 1200 and 400 years ago--the middle Middle Woodland-Late Woodland period. 2) The duration of occupation is unclear, yet the presence of projectile points, preforms, scrapers, a drill, pottery and graphite suggest that the site acted as more than the location of a stopover by a transient hunting party. 3) The recovery of over 1,000 fragmentary pieces of bone might also indicate an extended period of occupation. Unfortunately, the intensive burning and subsequent disintegration of the bone leaves us with a less than complete picture of the game which was consumed by the site's inhabitants. Only fourteen bone fragments could be identified, yet even this information produces an interesting picture of subsistence practices (see Figure 41).

Deer bones are clearly the most frequently recognized. Rabbit (based on teeth) is present; a vertebral centrum, phalange and skull fragments are likely to be from one or more squirrels; a humerus fragment may be from a bear. There are a great number of leg bone shaft fragments. Most are probably derived from deer, but fragments in the raccoon-woodchuck size range are represented, as are skull and rib pieces from such medium-sized mammals. In short, a diversified hunting/trapping approach to food acquisition seems to have been followed by this site's occupants. (A large number of seeds were recovered in the flotation samples which may represent gathered plant foods as well.) Neither fish or turtle bone nor nut fragments were encountered even though the flotation of soil samples from Feature 10 was carried out.

The specific bones identified from one or more deer conform to a pattern noted at such Middle-Late Woodland period sites as VT-FR-104 and 134. Carpals, metapodials, phalanges and sesamoids (all bones of the lower legs) are present. The upper leg bones, pelvis, vertebrae, skull (?), ribs

Figure 50. Distributions of Chert Flakes, VT-FR-140, T.P. 72 Ext.



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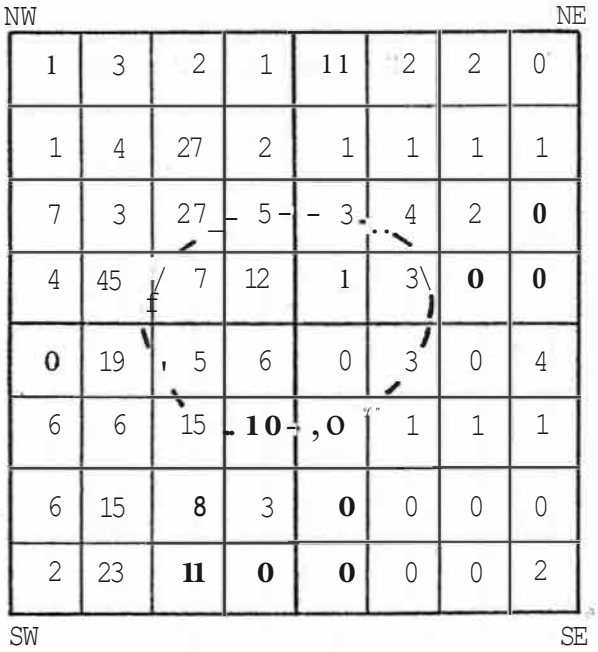
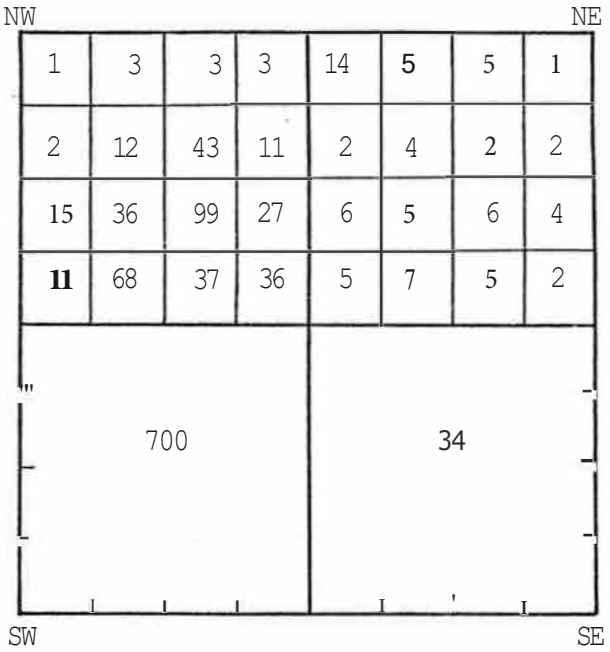


Level: 2

Dashed line indicates Feature 10.



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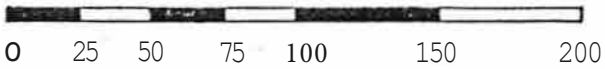


Figure 51. Distributions of Quartzite Flakes: VT-FR-140, T.P. 72 Ext.

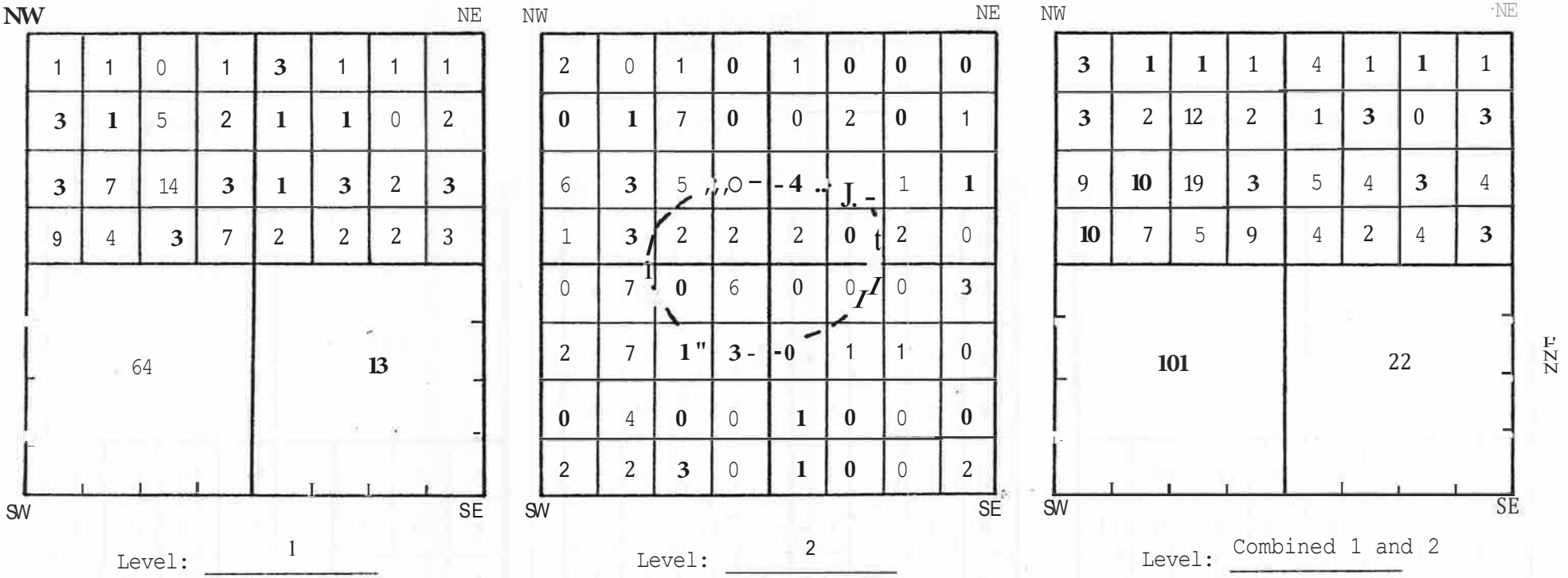
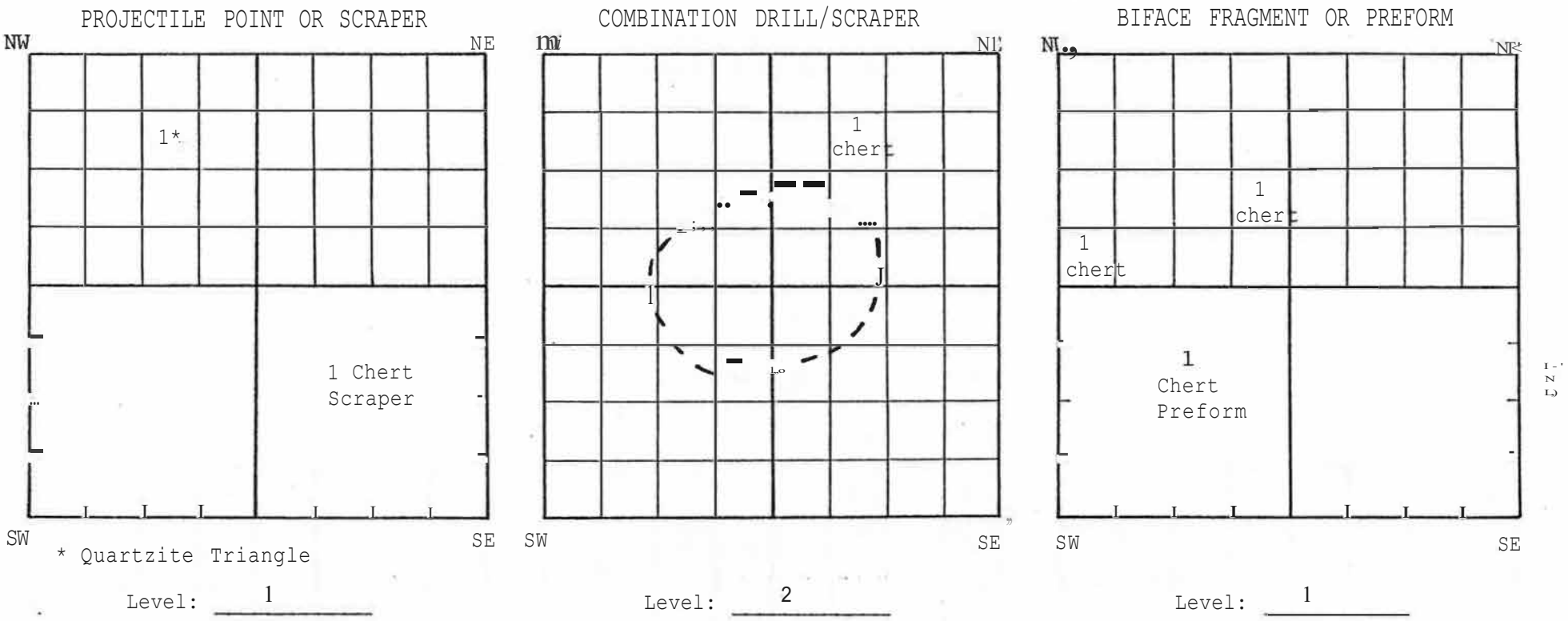


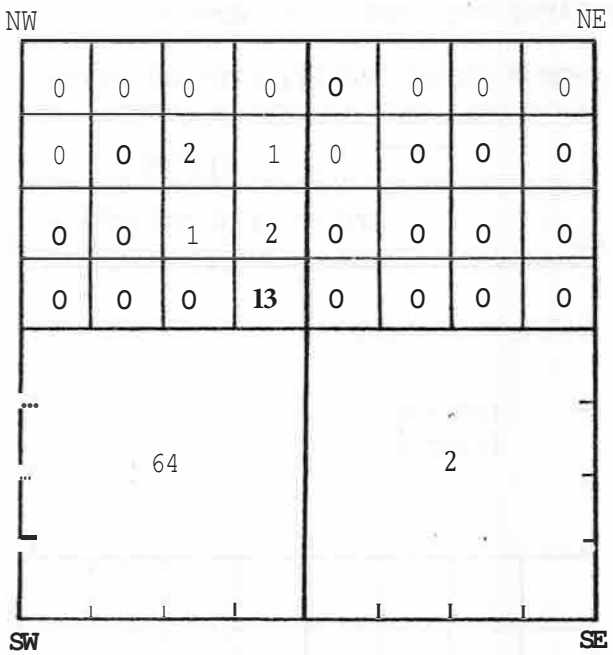
Figure 52. Distributions of Stone Tools, VT-FR-140, T.P. 72 Ext.



Note: On this figure, blank spaces indicate that unit was excavated, but no artifacts were recovered.

Dashed line indicates Feature 10.

Figure 53. Distributions of Prehistoric Pottery: VT-FR-140, T.P. 72 Ext.



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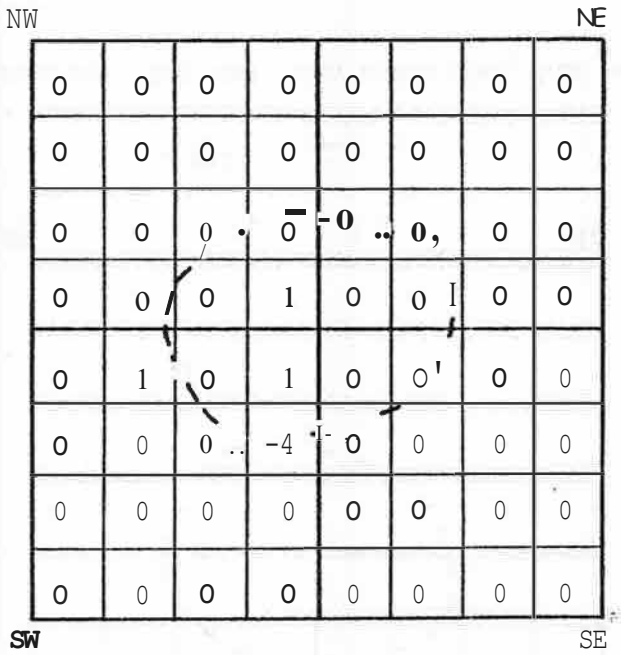

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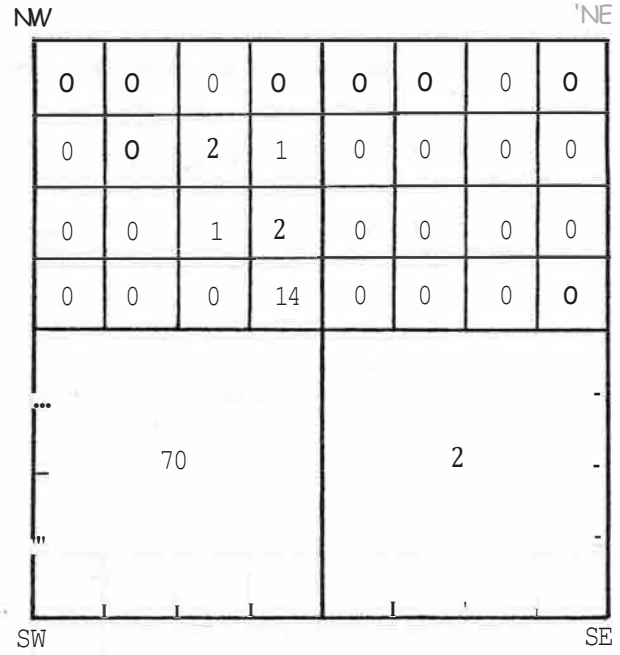
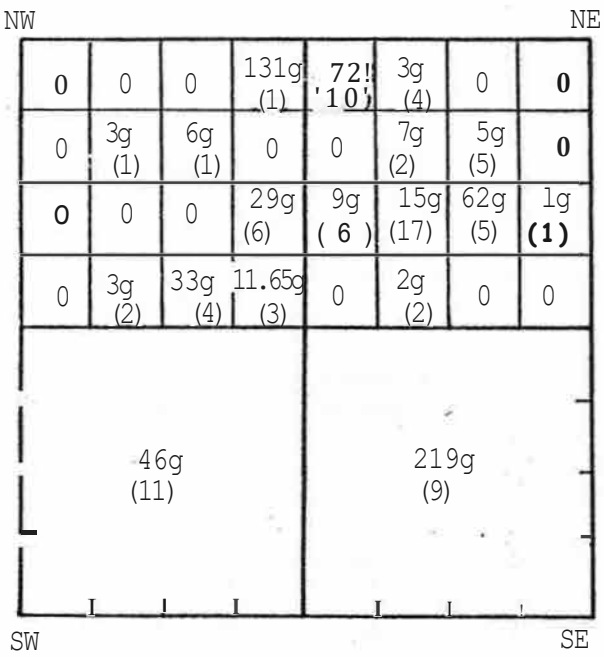
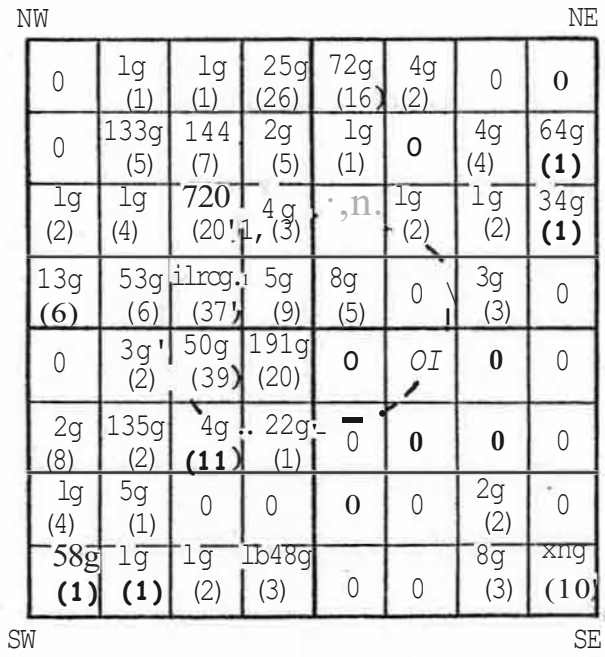


Level: Combined 1 and 2

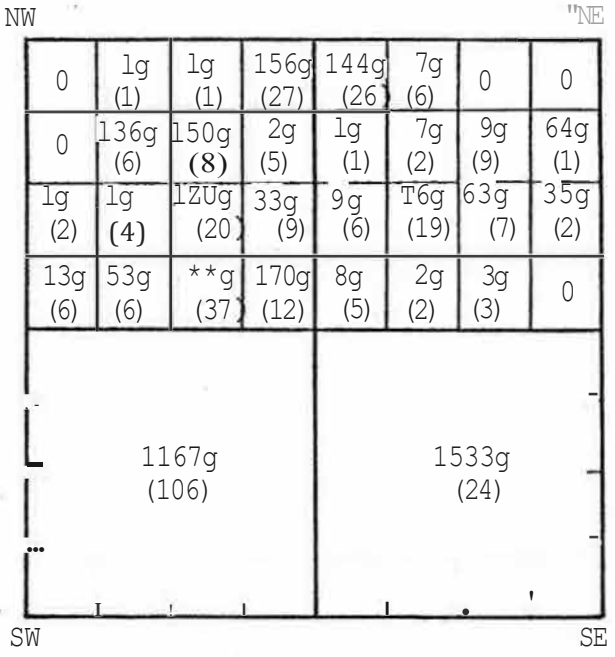
Figure 54; Distributions of Fire Cracked Rock: VT-FR-140, T.P. 72 Ext.



Level: 1



Level: 2



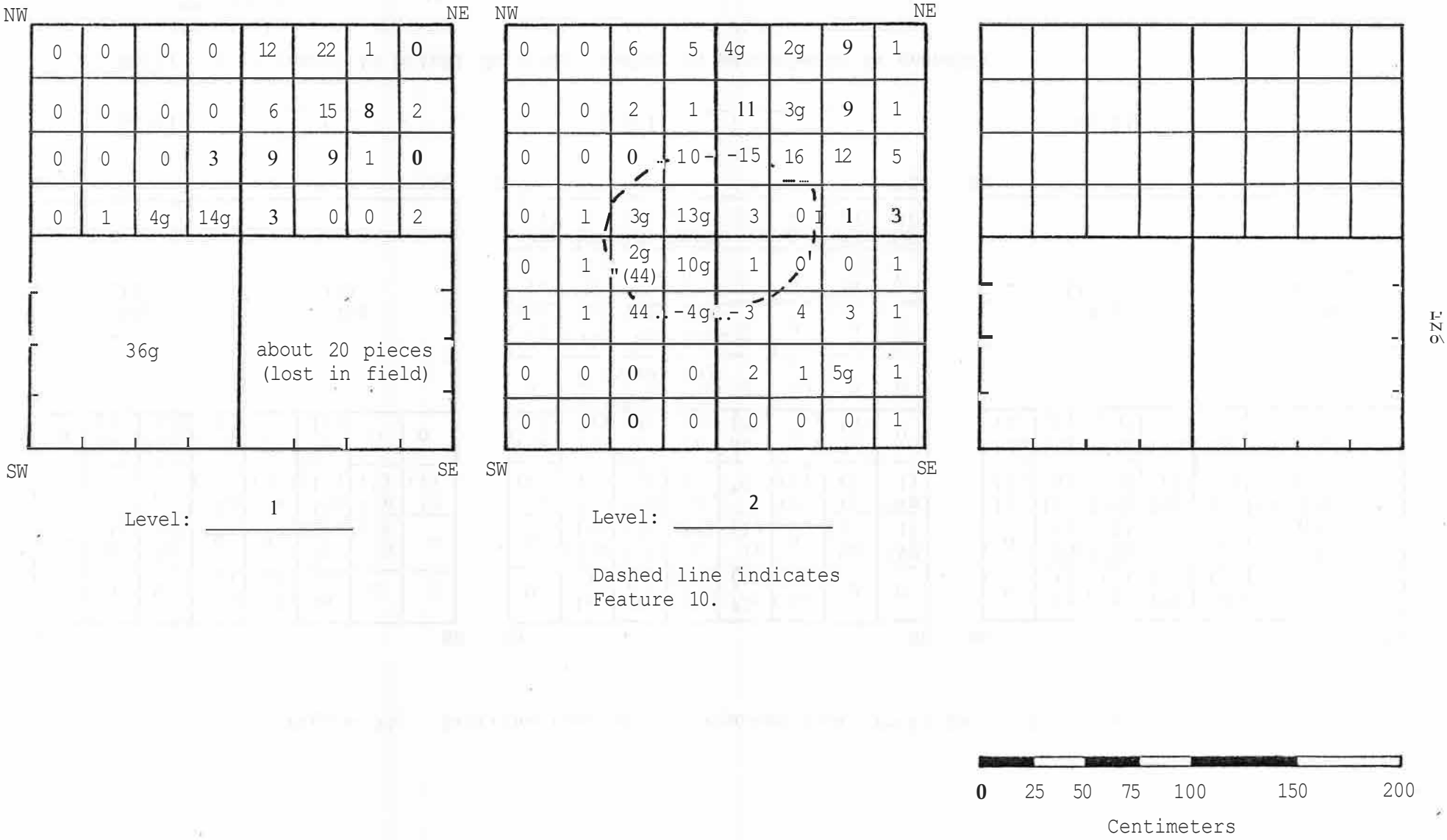
Level: Combined 1 and 2

Note: First number is weight in grams, number in parentheses is quan'tity.

* 2311g
** 1304g
*** 2344g

Dashed line indicates Feature 10.

Figure 55. Distributions of Bone: VT-FR-140, T.P. 72 Ext.



or scapulas are not evident. In light of this, it is interesting to note that fragments of skull, vertebrae, rib, upper and lower leg bones from medium and small mammals were all encountered in a burned condition. The implication of this contrasting pattern in bone disposal has yet to be determined.

General Inferences and Conclusions

Low Flood Plain:

Archaeological deposits on the low flood plain at VT-FR-140, Trace 28, have the following characteristics. 1) Both a broad range of artifacts and at least two types of cultural features are present throughout this 9,500 m^2 area. 2) Multiple occupations have undoubtedly occurred, but all temporally diagnostic artifacts and two C-14 dates indicate that such occupations were restricted to the Middle-Late Woodland period. 3) Limited evidence from TP49 and 51, however, does suggest that the cultural remains from a spatially limited, but earlier occupation, may be present at depths of 75-90cm near the river. 4) All cultural artifacts on the higher portion of the flood plain were recovered from a modern plowzone context. Cultural features, such a Feature 8 in Trench 2, extend below the plowzone. 5) Where sampling has been sufficient to provide a horizontal picture of artifact distributions, it is evident that even though plowing has occurred artifact clusters are still tightly focused. Thus, archaeological deposits still exhibit good integrity. 6) In a roughly 80m (E-W)-by-20m (N-S) zone adjacent to the river channel, artifacts and features are clearly associated with a distinctive light grey bed of very fine sand which has been designated Level 4. Because this discrete bed occurs at 50-55cm below the surface, it has never been plowed. The integrity of deposits here is excellent. In fact, this is one of the few areas within the entire District where house forms have probably survived intact.

7) A preliminary analysis of the data collected to date suggests that at least several of the identified clusters of artifacts and features define late spring-summer base camps. As such, these sites would represent a distinct seasonal and functional class of site within the Highgate Falls Prehistoric Archaeological District. Such sites seem to differ considerably in function, seasonality and duration of occupation from those sites encountered downstream within Tracts 1-8 (VT-FR-103, 104, 105, 130, 151, 152 or 153) and probably from VT-FR-134, 135, 136 or 137 located upstream. Undoubtedly, such base camps as those at VT-FR-140 also represent an integral part of the settlement system employed by connnunities of people who used the Missisquoi valley during the Middle-Late Woodland period. Only through an intensive evaluation of such sites can the role which they played actually be defined. Further excavation of one or more focused activity areas could significantly increase the amount of current information which has been generated through very limited samples of such sites.

High Terrace--Eastern Portion:

Undoubtedly the archaeological site which was found here is temporally early. As such it is atypical of sites within the District. The identification of so few sites of this apparent antiquity could be due to at least

two reasons. Either prehistoric people at such time made little use of this segment of the valley or early landforms on which such sites could be situated are not commonly encountered in the District. Based on the information collected to date, the latter possibility may be the more likely. Equivalent early terraces do not exist in Tract 1, 23, 24 and are of minimal area in Tracts 2-8 and 17. They are only fairly prominent within Tracts 27 and 28. Even within these tracts, only a few, roughly contemporaneous sites are thought to exist. Little else, aside from their possible locations, is known about them. Thus, the site encountered on the high terrace is the best example of a class of site which has not typically survived within the District.

The sampling results indicate that the structural integrity of this site as a whole is relatively good. Cultural artifacts discarded within a number of activity areas have been incorporated into the plow zone on the upslope side of the terrace, but even here, discrete horizontal clustering of artifacts occurs. On the downslope side of the terrace, artifacts are buried well below the plow zone and features such as the probable hearth and potential house remains have escaped mechanical disturbance. Thus, the distributional patterns of artifacts which could be translated into descriptions of human activities are present. Because it is also likely that multiple occupations have not occurred on this portion of the terrace overlapping distributions of temporally dissimilar artifacts should not obscure pattern recognition. Thus, the clarity of the cultural information should be very good.

In brief, this site is temporally unusual, contains a considerable density and range of cultural deposits within a 10 x 40m area, and possesses both good structural integrity and clarity of information. For these reasons, the site deserves careful consideration in any mitigation plans which are developed.

High Terrace--Central Portion:

This elongated topographic feature was once situated adjacent to the Missisquoi River's channel. Subsequently, the low flood plain developed as the channel moved laterally to the south. As a landform, this high riverine terrace was available for prehistoric occupation by at least 7,500 years ago, and perhaps earlier. Sampling has identified at least six artifact clusters on this terrace. Each cluster appears to be restricted in size; in most cases, artifacts are buried below the modem plow zone. The dispersed distribution of the positive test pits indicates that separate occupations are very likely to be represented. Given the age of the terrace, if these artifact scatters represent residential bases which people built fairly close to the river's edge, then such sites are likely to date from the Early-Middle Archaic period, some 5500-8000 years ago. Because no temporally diagnostic artifacts have been recovered, however, this conclusion is unconfirmed.

With respect to the Highgate Falls Prehistoric Archaeological District, these poorly defined site areas have at least the potential for contributing significant information about cultural adaptations employed by communities

who used this particular segment of the Missisquoi watershed during the Archaic period. This elongated riverine terrace is also the largest land area within the District where early occupations could occur. For these reasons, some extended, but very focused, sampling should be undertaken at one or several of these site areas. If, after further testing, such sites prove to be temporally and structurally similar to the site identified at the eastern end of the terrace, further data recovery may not be warranted. However, if these sites are not contemporaneous, consideration must be given to a more extended data recovery program.

Terrace--Westem Edge:

A level terrace at the western edge of VT-FR-140 has been isolated from adjacent portions of the terrace by erosional channels which drain from the interior of Tract 28. A roughly 576m^2 area remains which has never been disrupted by modern plowing. Cultural deposits are limited to depths between 10 and 25 cm, with this limited vertical dispersion produced by minor root and insect activity. Horizontal displacement appears to have been minimal. Thus, this site exhibits good to excellent integrity. Based on the temporally diagnostic artifacts recovered, it is inferred that this site is roughly contemporaneous with VT-FR-103, 104 (low terrace), 105, 151, 152, 153, 140 (low flood plain), 139 (low flood plain) and 134. Its exact age in unknown. In terms of the fairly broad range of artifacts which were recovered, this site may be more functionally equivalent to such a site as VT-FR-134 than to sites along the south bank of the river downstream from Tract 28. In brief, the integrity of the site and the density and range of artifacts which are associated with it strongly suggest that significant cultural information could be obtained from the remaining 99% of this small terrace. This site warrants careful consideration.

SITE EVALUATION FOR TRACT 27 or VT-FR-139

Background: Reconnaissance Phase Sampling Resulcs

VT-FR-139 was discovered during the initial reconnaissance of Tract 27, a large, high flood plain presently used for corn cultivation (see Figure 4). Since the cornfield had not been harvested, scheduling difficulties made it impossible to test the bulk of the tract. Two lithic flakes, one quartzite and one chert, were noted along the eastern fringe of the plowed area, approximately 50 m from the river's edge. These artifacts were not collected, but were left in place until a larger sample could be obtained.

Site Evaluation Program: 1982

Sampling Scheme

One of the most significant questions left unresolved by the initial reconnaissan€e survey of the entire project area was whether discrete concentrations of artifacts and features could be identified within such large areas as Tract 1, 17, 27, 28, etc. If they did exist, such concentrations of artifacts and features might be the cultural remains left behind during individual occupations. As such, these clusters would constitute very meaningful units of archaeological study, because single slices of community life could be reconstructed. By analyzing several discrete clusters from similar environments it might then be possible to detennine if there were contrasts or similarities between what prehistoric residents were doing during different occupations. Such information could be significant for identifying both changing and stable p tterns of cultural adaptation in northwestern Vermont .

Such patterning may have even broader implications for addressing general anthropological questions. For example, because many of the sites within the Highgate Fall Archaeological District date from the Middle or Late Woodland period -- a time frame in which people in Vermont shifted from a hunting/fishing/gathering food economy to a partially horticultural one -- contrasts in archaeological patterns between sites dating from these two periods would help to determine what effects the adoption of horticulture played in structuring the lives of prehistoric Vermonters. In turn, such information would be particularly germane for answering the questions of if, how and under what conditions societies in general develop greater complexity and more sedentary residential patterns. once horticulture is adopted as a means of providing a stable food resource.

Within the Highgate Falls project area there are only two large pieces of plowed agricultural land--part of Tract 17 and Tract 27 (see Figure 4). Because plowing exposes considerable surface area which can be sampled for archaeological remains, it was felt that an intensive surf-ace walkover of Tract 27 might provide much needed information on the number and size of artifact clusters which could be expected to occur in similar areas. For this reason, a portion of flood plain totalling approximately 12 acres was intensively surface collected by a crew of 5 spaced at roughly 7-feet intervals. Surface visibility was very good to excellent. The positions crfall artifacts were mapped with a transit set up at several established datum points on the border of the field.

Sampling Results and Interpretation

The distribution of 69 cultural artifacts recovered from Tract 27 is shown in Figure 56 . The inventory consists of: 2 quartzite triangular projectile points (see Plate I); the tang from another quartzite point; 2 broken chert bifaces; 31 chert flakes and 2 blocky pieces of chert; 2 quartzite flakes; 1 fragment and 1 flake of quartz; and 27 pieces of fire cracked rock. Although a few items were scattered throughout the entire tract, two focal areas of past settlement are suggested by the artifact distributions. The first is in the eastern portion of the flood plain. It consists of a 140 x 30 m zone of scattered flakes (predominantly chert) and projectile points running parallel to the river channel. Only a few fire cracked rocks were found. The second consists of a roughly 75 x 50 m area in the western end of the field which abuts a small brook. It was here that the two chert bifaces, 10 chert flakes, a quartzite flake and 13 pieces of fire shattered rock were encountered.

There are several reasons why developing cultural interpretations from these distributions is difficult given the present level of study. First, because relatively few artifacts were recovered, reconstructed distributions based on this sample may not represent the distributional patterns which are actually there. We know, for example, that in the low flood plain in Tract 28 just downstream much of an artifactually dense Middle Woodland component is buried below the level affected by modern plowing. Because the area along the river bank in the eastern portion of Tract 27 is topographically similar, the actual artifact density here may be considerably under represented because only a few items may have been brought to the surface by rodent burrowing, etc. Secondly, flood waters overtopped this field in the spring before sampling was undertaken. Currents redeposited a tremendous amount of cut corn chaff- left from the preceeding fall harvest in the brook channel on the western edge of the field. How many small artifacts were removed in the process cannot be determined. Even recognizing these limitations, it still seems reasonable to presume that one or more Middle-Late Woodland period occupations (based on the presence of triangular Levanna points) took place within the eastern portion of Tract 27 along the river -- occupation sites which should be roughly contemporaneous with those residential sites on the low flood plains in Tracts 28 and 24. Horizontal site dimensions of 140 x 30 m in Tract 27 are also consistent with the horizontal extent of Middle Woodland period artifact distributions recorded in Tract 28.

The apparent clustering of artifacts along the brook in the western segment of the tract may represent a second focus of prehistoric activity. Items found above the 198-foot contour line probably escaped movement by last spring's flood waters and, with elevations in the 198-200 foot range, flooding during the past several thousand years should not have buried archaeological deposits below levels reached by modern plowing. Thus the apparently low artifact densities may actually be lower here than in the area along the riverbank. Given the lack of temporally diagnostic artifacts and considering that this higher portion of the flood plain was probably formed 8000 years ago (see the section on geomorphology for supporting data), occupation(s) along the brook could be of considerable age.

General Inferences and Conclusions

Unfortunately, from a comparative point of view, the limited number of artifacts recovered throughout Tract 27 currently offers little interpretive

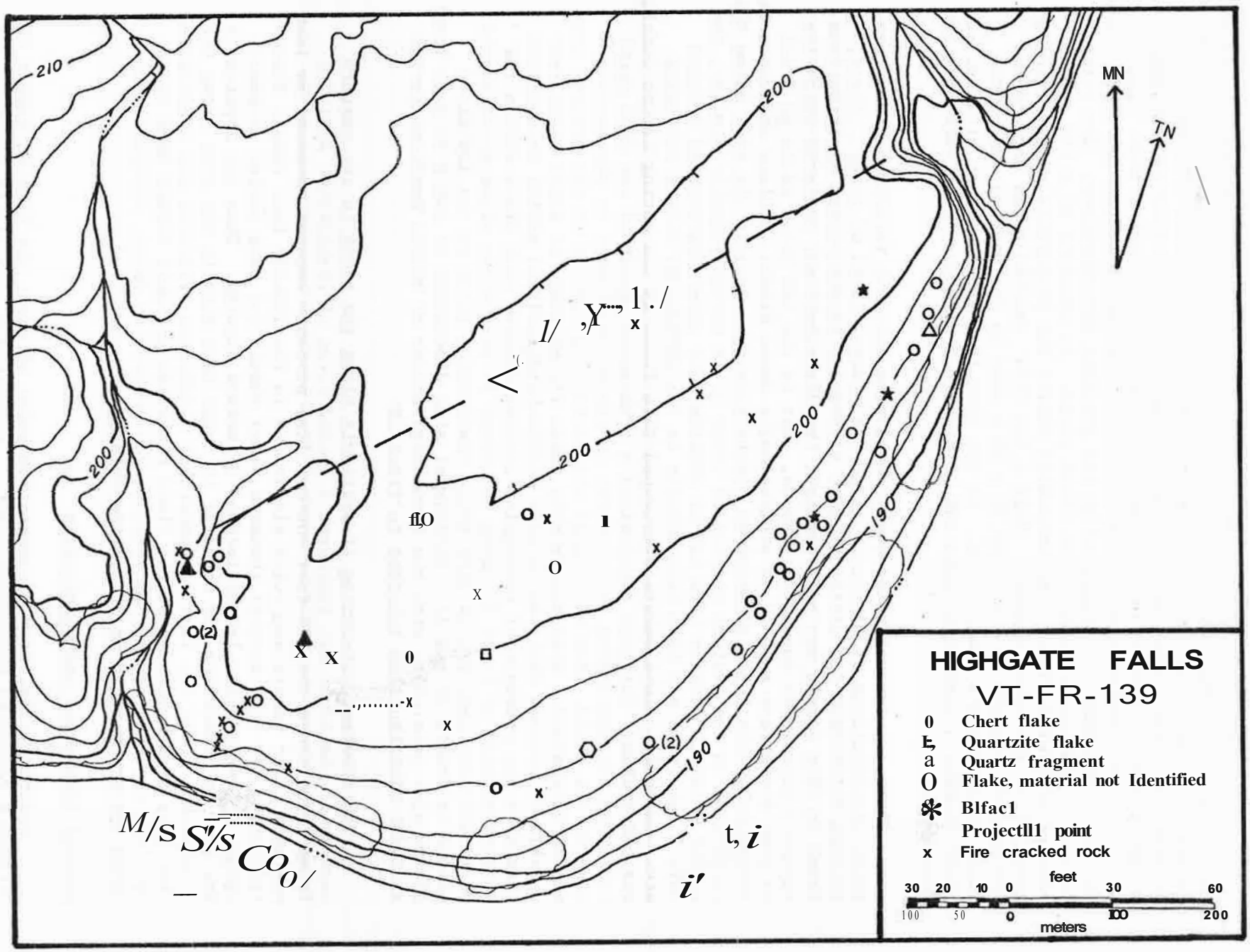


Figure 56. Artifact Distributions from an Intensive Surface Walkover of VT-FR-139.

potential aside from identifying two focal areas used by one or more prehistoric communities. The presence of projectile points, flakes and fire shattered rocks suggeststhat hunting provided food resources, that the maintenance of stone tools was undertaken, and that the site acted as a residential base where hearths were employed for cooking and to provide warmth. These are activities which are probably common to all groups who used this portion of the Missisquoi Valley.

Without further study, however, the archaeological potential of sites within Tract 27 should not be underestimated. If cultural deposits are buried below the plowzone near the river (a probability suggested by the work in Tract 28), and particularly if they represent slightly older or younger occupations than the Middle Woodland components in Tracts 24 and 28, such deposits could provide significant comparative information for dealing with questions of cultural stability and change. For this reason, limited subsurface testing to determine whether undisturbed cultural deposits do exist seems warranted. If a discretely stratified component is found to be buried, an extended sampling program should at least be considered, but the decision to proceed with such an undertaking will depend to some extent on the information gained from VT-FR-134 and 140. For the site area adjacent to the brook, if it can be established that this is the location of an early occupation, then even the recovery of a larger sample of artifacts from a plowzone context would provide critic-al comparative data for interpreting other sites located in Tracts 4 and 28 which are believed to date from 4000-8000 years ago. At a minimum, it seems appropriate to nesample this portion of Tract 27 once it has been replowed.

SITE EVALUATION FOR TRACT 24 or VT-FR-134, 135 and 136

Background: Reconnaissance Phase Sampling Results

VT-FR-134

VT-FR-134 was encountered during the course of the excavation of Transect 1 in Tract 24, a moderately broad strip of alluvial terrace which stretches for approximately 600m (2,000 ft.) along the eastern bank of the Missisquoi River. This specific sampling unit crosscuts a portion of terrace that is significantly higher than the surrounding topography and exhibits a lesser degree of surface erosion due to flooding (see Figures 57- 58).

Nine of eighteen (50%) test pits excavated in Transect 1 contained prehistoric cultural material, with all artifacts focused between Test Pits 3 and 13. Test Pit 5 was not excavated because of the high density of artifacts in adjacent test pits. Data classes represented in the subsurface inventory include fire shattered rock, calcined bone, and both chert and quartzite flakes. Two prehistoric pottery sherds, one of which was decorated with cord marking, were also recovered. In addition, Test Pit 4 exposed the top of a definite hearth with clearly associated fire shattered rock, bone and lithic debitage. The high quantities of fire shattered rock from other test pits in the transect also suggest the presence of additional hearths that were less visible.

Clear plow zones were present in the majority of the test pits, and extended to variable depths between 20 and 30 cm below surface. The bulk of the prehistoric cultural material found along the transect was recovered from the lower levels of the plow zone and from the plow zone/B horizon interface. However, several artifacts were found in the upper levels of the B horizon; the hearth in Test Pit 4 extended below the interface zone, indicating that portions of the site may not have been disturbed at all by cultivation.

In addition to the subsurface inventory, examination of the eroding riverbank to the west of the transect resulted in the recovery of thirty-one artifacts. The greater percentage of these surface finds was comprised of fire shattered rock fragments, but flakes of quartzite, chert and quartz, four pottery sherds and a triangular projectile point preform were collected. On the basis of the subsurface and surface finds of pottery and of the triangular preform, it was suggested that VT-FR-134 represents a middle Middle-early Late Woodland period occupation.

VT-FR-135

Transect 2, a sample unit consisting of two test pits, was situated on a narrow shelf of alluvial terrace approximately 18m (60 ft.) from the river's edge and separated from VT-FR-134 and Transect 1 by a slight depression which probably represents the effects of flood erosion (see Figure 57). Both test pit soil profiles showed a more intact sequence than those in the latter test pits of Transect 1, and it seemed likely that this

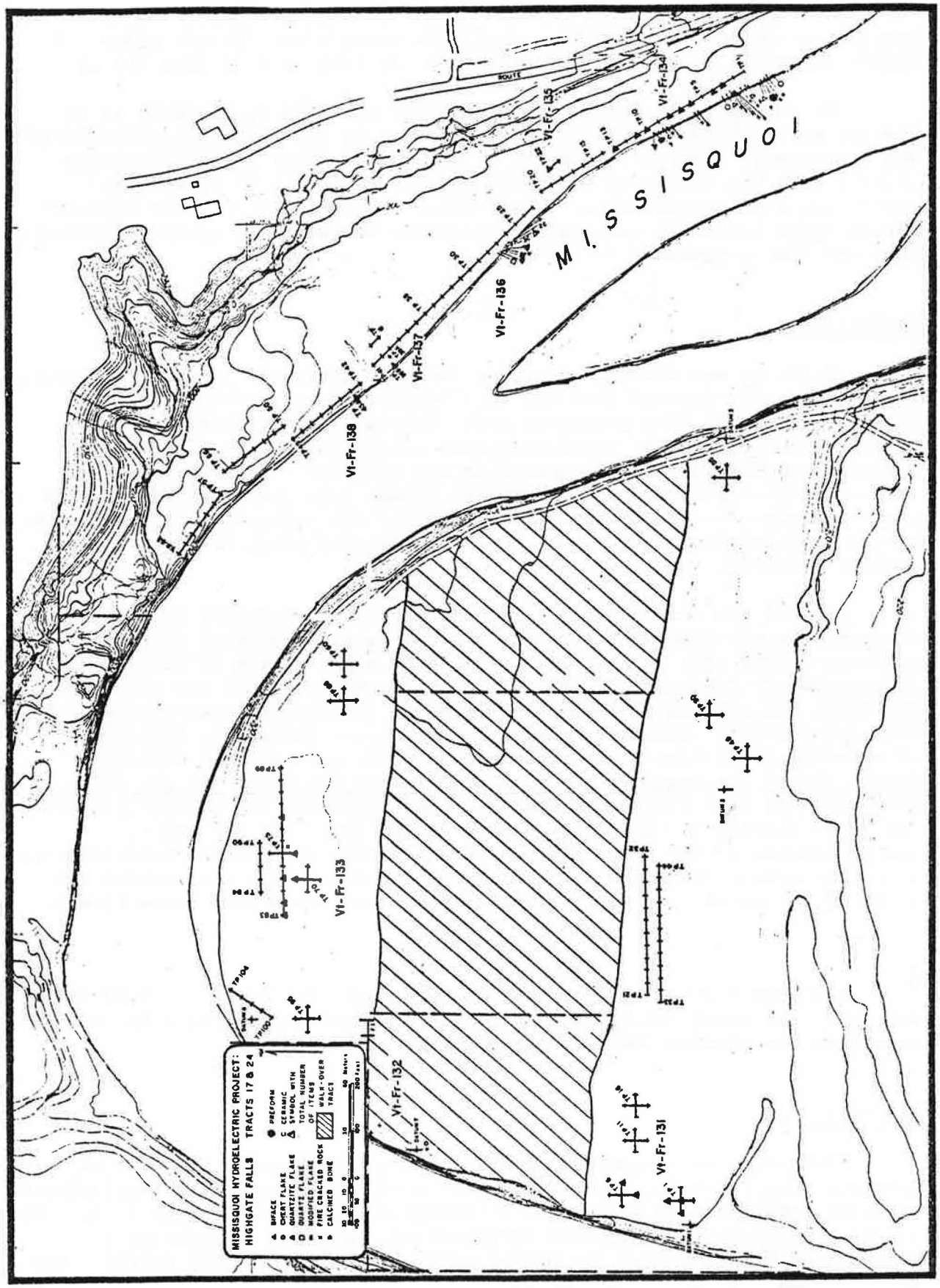


Figure 57. Sampling Locations and Sitas Identified in 1980: Tracts 17 and 24.

terrace extension was less disturbed than areas closer to the river. A single quartzite flake was recovered from the plow zone in Test Pit 22.

The morphological genesis of this part of Tract 24 appeared to be similar to the higher portions of the terrace to the south where VT-FR-134 was discovered. However, Test Pit 22 was sufficiently removed from the river's bank and separated by enough sterile test pits to justify an additional site designation. It was felt, however, that further investigation might confirm a cultural relationship between this apparent activity area and that documented in VT-FR-134.

VT-FR-136

VT-FR-136 was discovered during the surface inspection of the eroding riverbank to the west of Test Pit 26, Transect 3, and consisted of a general scatter of fire shattered rock, quartz and quartzite flakes and 6 pottery sherds, one of which exhibited cord marking (see Figure 57). A Middle Woodland period of occupation was proposed. These artifacts were tightly clustered in an 8m (25 ftJ linear area. but were spread from top to bottom of the slumping bank. Thus, it was impossible to provide an accurate estimation of their in situ stratigraphic level or depth before erosion occurred.

None of the test units aligned in Transect 3, parallel to and only 8m or less from the edge of the river, produced any evidence of cultural activity. This lack of subsurface artifacts might be due to either depostional or erosional processes, or to a combination of the two. On the one hand, the surface profiles from Transect 3 indicated that fairly complex depositional sequences existed in the area. Therefore, deposition of alluvium might have been sufficient to cover any cultural horizon at depths beyond the reach of the test pits--about 80-100cm. On the other hand, obvious bank slumpage along the river suggested the possibility that the major portion of the site had been eroded away. In any event, quantification of the site-specific stratigraphic and spatial relationships along the eroding bank and within the flood plain itself were beyond the scope of the survey and would require additional subsurface investigation.

Although further site evaluations were not conducted for VT-FR-137 and 138 which lie along the river bank at the northern end of Tract 24, brief summaries are provided here for comparative purposes.

VT-FR-137

VT-FR-137 was discovered on the eroding riverbank to the west of Transect 3 in Tract 24, and consisted of a tight cluster of 27 small pieces of prehistoric pottery along with 2 quartzite flakes (see Figure 57). Two of the pottery sherds exhibited cord-paddled exteriors, indicating a temporal affiliation with the Middle-early Late Woodland time period. Two test pits were subsequently excavated.

A 50cm unit, Test Pit 39B, was placed directly on the riverbank slumpage over the point where the pottery was discovered and five quartzite flakes were recovered. In addition, the east wall of the test pit was troweled back into the bank to reveal a relatively intact soil profile which contained a discrete lens of charcoal-infused soil which terminated in a small pit-like feature. This charcoal lens may be the result of prehistoric activity, as two of the quartzite flakes were directly associated with this stratum, at 0-20cm below the bank surface. The other three flakes were recovered from the wall scrapings.

A second test unit, Test Pit 39A, was excavated on the terrace surface between Test Pits 39 and 40 and 4m closer to the river. No cultural material was found. However, a second discrete band of charcoal was noted at a depth of 95cm below surface, providing tentative evidence linking the two anomalies over a horizontal distance of roughly 5m. This correlation was by no means conclusive, because the severe bank slumpage and the dynamic character of soil buildup in this locality limited any attempts at extrapolating observed soil stratigraphy over any distance. Additional subsurface investigation would be necessary before the overall size and content of VT-FR-137 can be determined.

VT-FR-138

VT-FR-138 was designated on the basis of a third riverbank feature discovered in Tract 24 (see Figure 57). Initially, a linear arrangement of three large river cobbles was found near the base of the eroding bank to the west of Transect #4. Both the presence and the particular linear orientation of these rocks in a very fine sand to silt soil were anomalous enough to justify a closer inspection. It seemed possible that these rocks had been carried here.

Subsequent excavation of a roughly 30 x 80cm test unit (43A) over the feature revealed six additional cobbles and a number of smaller rock fragments comprising a hearth-like formation. While no associated charcoal was evident, there appeared to be no conceivable way that this feature could have formed naturally, yet no artifacts were recovered to confirm this impression. One possible explanation of the absence of charcoal (if this feature was formerly used as a hearth) is that a flooding episode could have washed away all traces of burning while still leaving the heavier rock in place. Any connection between these rocks and a prehistoric occupation is, however, still in question.

Site Evaluation Program: 1982

Sampling Scheme

The southern portion of Tract 24 which contains VT-FR-134, 135 and 136 was selected for more intensive site evaluation, because dense cultural deposits had been encountered in 1980. Fieldwork began by preparing a detailed, 25cm-interval contour map (see Figure 58) and by establishing a baseline from which all excavation units could be referenced.

Three 2m-wide backhoe trenches were excavated perpendicular to the river bank. Trenches 1 and 2 crosscut the alluvial terrace and the site which had been designated VT-FR-134. Trench 3 was dug perpendicular to a section of river bank where artifacts had been found. This location had been designated VT-FR-136. These trenches were the sole means employed to evaluate the tract's geomorphology, to test for buried cultural horizons, to expand the artifact inventory and to determine whether or not concentrations of artifacts and features were present. This was actually the first tract tested during the 1982 field program, so that it was here that we began to recognize the weaknesses in the original testing methodology and to experiment with refining the sampling approach. In addition, 74 soil samples were analyzed in order to determine whether relative changes in their phosphate content might identify zones of heavy organic refuse. All but nine samples were derived from Trench 1.

Trench 3 had a total length of 12m and was located between grid points N183/185WOJW12 (see Figure 58). This was the first trench to be excavated. Work proceeded in stages. First, the sod was removed from the general area of the trench by the front-end blade of the backhoe. Second, the trench was divided into 2 x 2m units, staked and strung with twine as a guide for the backhoe operator. Third, each 2 x 2m unit was excavated by the backhoe with soils differentiated into two levels. Level 1 averaged about 70cm in depth, with Level 2 being dug to about 140cm. Backdirt from each 2 x 2m unit was isolated by level in separate piles to either side of the trench. Fourth, backdirt from three of the 2 x 2m units was either completely or partially screened through 1/4" mesh screens (N185W12: Levels 1 and 2 completely screened; N185W8: Levels 1 and 2 50% screened; N185W4: Levels 1 and 2 50% screened). No cultural artifacts were found. Fifth, the trench was then excavated to an average depth of 2.25m to obtain stratigraphic information and three vertical profiles were recorded at 5m intervals along the north wall (see Figure 12). After cleaning, no anomalies were visible in the trench walls which might have been produced by prehistoric occupations.

We began to recognize that cultural levels might not be deeply stratified anywhere within Tract 24. Thus, the remains left from different prehistoric occupations of the same site might not be separated by sterile flood deposits. If the lack of vertical stratification proved to be the case for the area to be evaluated with Trenches 1 and 2, then the only approach which could be used to differentiate separate occupations would be to identify any distinct horizontal patterns of clustered features and artifacts which might exist. Screening the thick, 2 x 2m

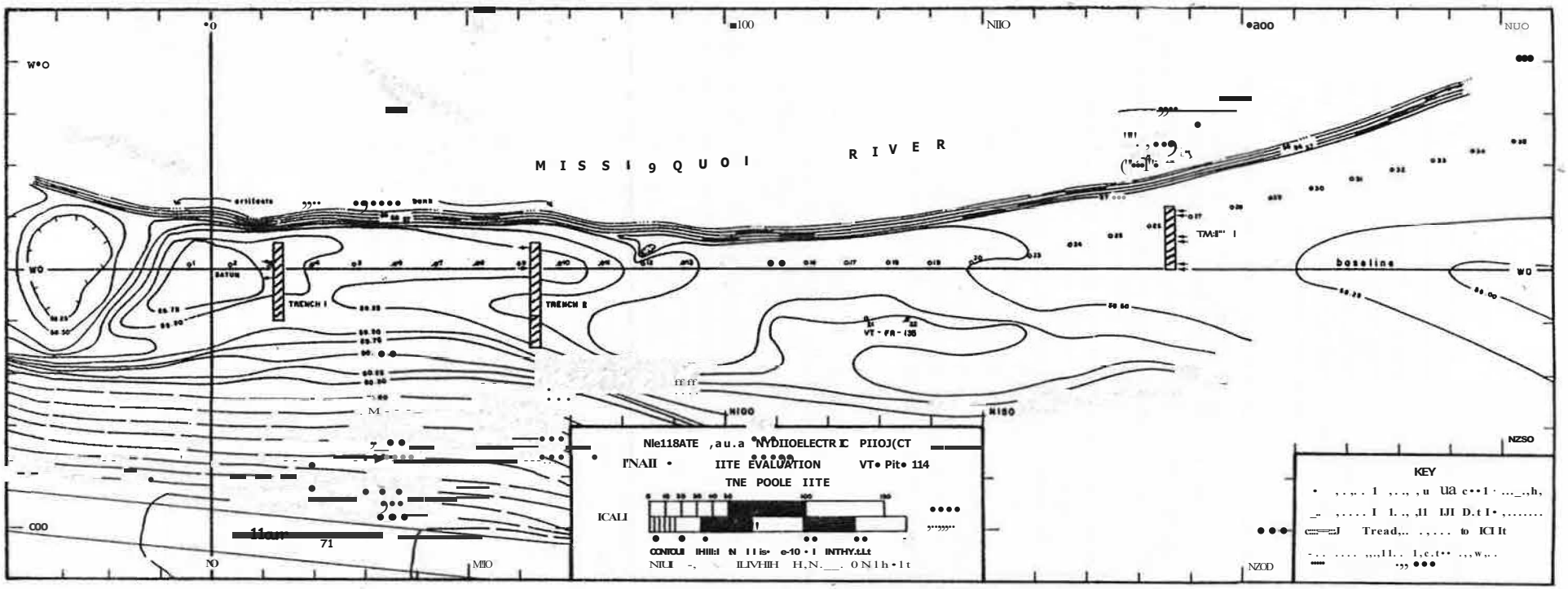


Figure 58. Southern Half of Tract 24: VT-FR-134, 135 and 136.

backdirt piles would simply not provide the type of horizontal resolution which was needed. By employing shovels to remove the top 20-30cm of soil in 1m units, however, better horizontal control could be maintained. Thus, the use of such control pits became a standard practice, and, as the cultural deposits were shallow, it took virtually the same time to shovel dirt from the pit to the screen as it did to shovel dirt from the pile of dirt left by the backhoe to the screen.

Trench 2 had a total length of 19m (N65/66W5-E14). The sod was stripped from the entire trench using the front-end blade of the backhoe. Between N65/66WS and E2 (14m^2), the plow zone--Level 1--was removed by 1m units (see Figure 58). Two of these units, N66W3 and N65W5, were taken down an additional 20cm to see if artifacts extended below the plow zone, but nothing was found. Because only limited quantities of artifacts were being recovered in the plow zone, beginning with N66E4 and extending to N66E15, 2 x 2m units were excavated to the base of Level 1 with the backhoe. Backdirt piles were kept separate and screened through 1/4" mesh. Units N66E4-8 and N66E14-15 were completely screened; a 25% sample was obtained from N66E12; N66E10 was not screened. Trench 2 was subsequently dug to a final depth of 2-3m between N66WS and N66E10. Both trench walls were cleaned and photographed. The profile from a 4m section (N64W4-W1) of the south wall was recorded (see Figure 14).

Trench 1 had a total length of 13m, running between N15/16W5-E9 (see Figure 58). The sod was stripped, then twenty-two 1m units were excavated by shovel to the base of the plow zone--Level 1. These 1m units include N15/16W5-E3 and N15E4-E9 (see Figure 61). Because large quantities of flakes were being uncovered, it was felt that the use of 1/8" mesh screens would provide larger samples that could be used for comparative purposes with other sites and to better gauge the types of lithic activities which had been undertaken at VT-FR-134. For these reasons, Level 1 soils from the NE and NW quads (50 x 50cm units) of N15W4 and from the NE quads of N16W3, N15W2 and N16W1 were screened using 1/8" mesh. Floor graphs were prepared of the base of Level 1 in N16W4, N16W2 and N1SW1 where remnant features--probably cooking hearths--and plow scarswere exposed. Flotation 9omplcn were taken from several feature areas. A partial grid was established down the length of the trench and soil samples were taken at 50cm intervals for phosphate analysis, as well as from the features (see Figure 63). The trench was finally excavated to depths of 2-3.5 meters from N16WS to N16E10. The trench walls were cleaned and photographed. A vertical profile was recorded of the south wall from N14W1 to N14E2 (see Figure 13).

Sampling Results and Interpretation

Two areas within Tract 24 are discussed separately. The first area encompasses that portion of the alluvial terrace surrounding Trench 3 and the prehistoric site designated VT-FR-136. The second involves a higher portion of the terrace to the south which encompasses Trenches 1 and 2 that were used to sample VT-FR-134. (VT-FR-135 was not evaluated, nor were VT-FR-137 and 138 at the northern end of Tract 24.)

As noted previously, VT-FR-136 was identified on the basis of fire cracked rock, flakes and pieces of pottery which were eroding from the river bank. Sampling within Trench 3 at VT-FR-136, however, produced no further evidence of a prehistoric occupation in either near-surface horizons or in deeply buried horizons within the alluvial deposits which formed this terrace. Because archaeological remains at VT-FR-134, 135 and 137 on the same terrace were located in the top 30cm, it was expected that roughly contemporaneous deposits would occur at similar depths at VT-FR-136. Nonetheless, the test pits which were dug here to depths of 80-90cm and parallel to the river bank during the 1980 survey (see Figure 57) also failed to identify cultural remains. Therefore, given the apparent lack of cultural deposits on the terrace adjacent to the artifacts which were found in the slumping bank, it was concluded that although prehistoric activity had occurred in this immediate vicinity, most of the evidence had been lost through cumulative bank erosion.

Trenches 1 and 2 were used to sample VT-FR-134 at the southern end of Tract 24 (see Figure 58). Prehistoric artifacts can presently be found within an area which measures approximately 15 x 100m, but it is also evident that some of the site has been lost through bank slumpage and erosion. The trenches and test pits combined provide a 2.5% non-random sample of the remaining surface area within the site. The artifact inventory from the two trenches includes the following:

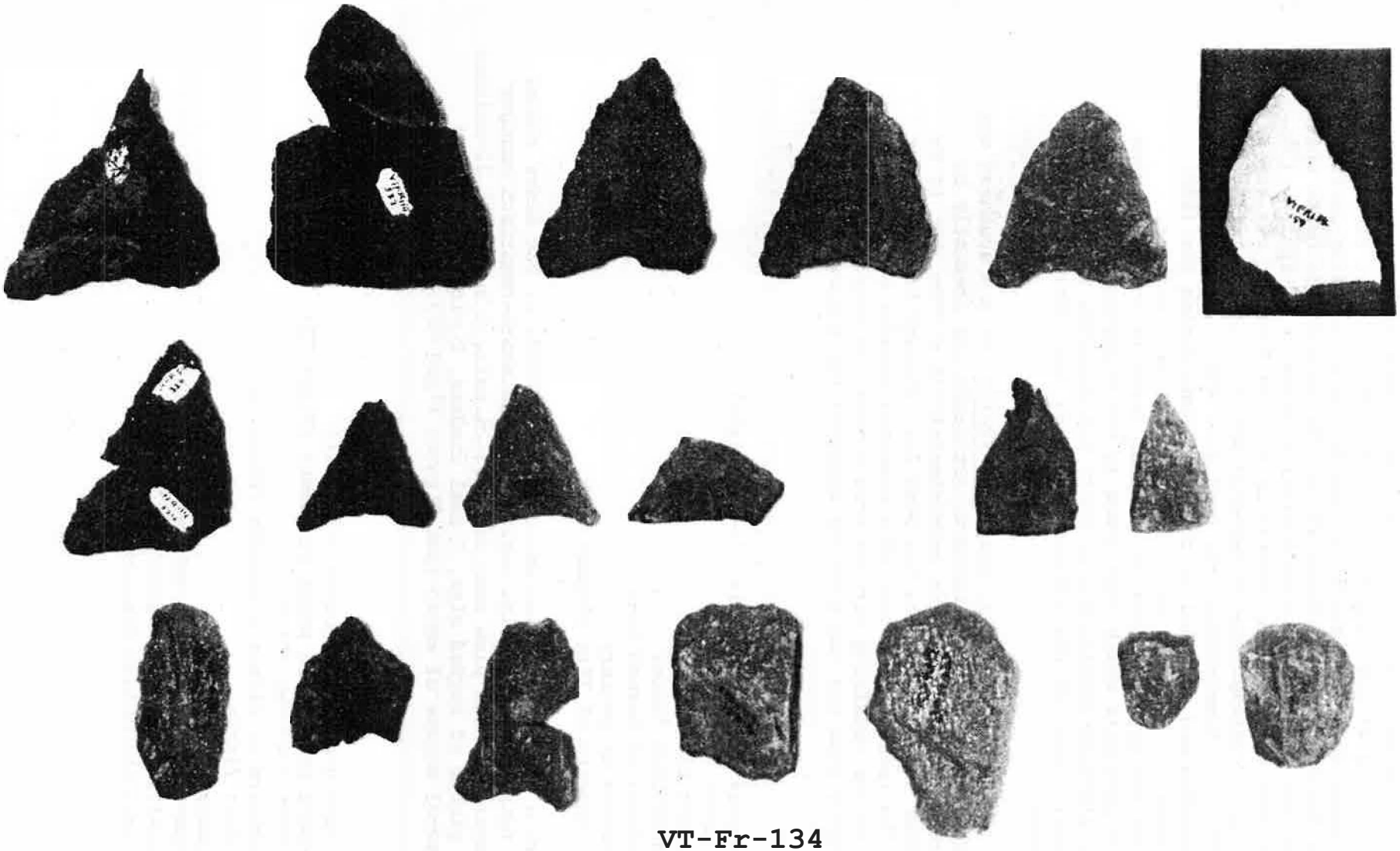
Trench 2:

1	quartz preform (Plate II--top right)
108	quartz flakes
24	chert flakes
11	quartzite flakes
16	pieces of burned bone
6	pieces of pottery
49	fragments of fire cracked rock

The remnants of a hearth were also encountered in N66E1-2, but heavy rodent burrowing had totally obscured its outlines. Nineteenth-twentieth century artifacts recovered in the plow zone include: 1 nail, 1 button, 1 22-caliber shell case, 2 pieces of barbed wire, 2 coal cinders, 2 pieces of broken bottle and several scraps of metal (see Figures 59and 60).

Trench 1:

2	chert projectile points (Plate II)
9	chert projectile point fragments (Plate II)
3	chert preforms (Plate II)
8	preform or biface fragments (Plate II)
2,056	chert flakes
1	jasper flake
2	quartzite projectile points (Plate II)
3	quartzite point fragments (Plate II)
3	quartzite biface fragments



VT-Fr-134

Plate 11

irr-FR-134

TOP ROW (left to right): Chert Levanna point (#352/441--6): N15El; chert preform (#310/337): N15W5; chert preform (11421): N16E3; ch<!rt preform (#441-5): NlSEl; quartzite Levanna po.int (#520): N16J;3; quartz prefotta (#159): N6.5E2.

BOTTOM ROW (left to right): C:111arteite utilized flakes (#441-9): tHSEl; chert flake drill (#441-8): N15E]; quartzite sc-raper (,i'410-3): N16W3; quart:zit:e scraper (#323-4): N16w4; quartzite scraper ('.143-2): N16W2; quartzite scraper (#311): N15W5; quartzite scraper (343-)): N16W2.

MIDDLE ROW (lef.t to right): Chert Levanna point (#324, 328): N16W4; chert Levanna point (#420): N16E3; quartzite Levanna poi·nt (/1404): N15W4; chert Levanna point base (1446-5): NlSES; chert prefor.111 (11518): N16W3; quan:zite point fr.agment (f440,--5): N16Wl.

327 quartzite flakes
5 quartzite scrapers (Plate II)
1 chert flake drill (Plate II)
1 chert drill bit (Plate III #11)
4 utilized chert flakes
1,052 fragments of fire cracked rock
352 pieces of pottery
1,222 pieces of burned (calcined) bone
8 charred butternut shells
unidentified seeds

At least two, and possibly three, shallow hearths were encountered (see Figure 6 . All portions of Trench 1 had been plowed, thus obscuring the upper parts of these features. Nonetheless, plowing has been infrequent and the dense concentrations of charcoal, calcined bone and oxidized earth produced by high temperatures define these hearths with sufficient clarity to identify them and to extract the associated contents for analysis. The following features in Trench 1 received numerical designations:

Feature 1: The remnants of a hearth were first encountered in the SE corner of N16W4. This feature contained dense concentrations of charcoal, calcined bone (n=341) and fire shattered rock. The upper portions of what was probably once a shallow pit had been disrupted by historic plowing so that distinct horizontal dimensions were no longer visible. The base was darkly stained, however, and extended about 3cm below the plow zone. As an estimated size based on field observations, this hearth was somewhat elliptical with a longer E-W axis, measured approximately 90 x 60cm, and extended into N16W3, N15W4 and N15W3. Bulk soil samples were taken from N16W4 and water screened through lnnn-mesh sieves to recover small bone and plant remains.

Feature 2: This designation was assigned to an elongated area along the west wall of N16W2 where dark staining intruded into the top of the B horizon. It was ultimately concluded that this was a plow scar and that the darker color may indicate that the plow had been drawn through another hearth beyond the limits of the test trench.

Feature 3: A concentration of burned bone (n=98) in the NW quarter of N16W2 was designated Feature 3. It was roughly 22 x 16cm in size and may have formed the base of a small pit which had been truncated by modern plowing.

Feature 4: An elliptical area of reddish (oxidized)soil, charcoal, burned bone (n=97) and occasional fire cracked rock extending between N16W2 and N16W1 probably represents another hearth. It measured roughly 75 x 50cm with its long axis going E-W. A deep plow furrow bisects the center of the feature on a N-S axis. Bulk soil samples were taken of the hearth's contents and precessed through lmm-mesh sieves to recover small bones and seeds.

Figure 59. Distributions of Quartz Preforms, Quartz, Chert and Quartzite Flakes: VT-FR-134, Trench 2.

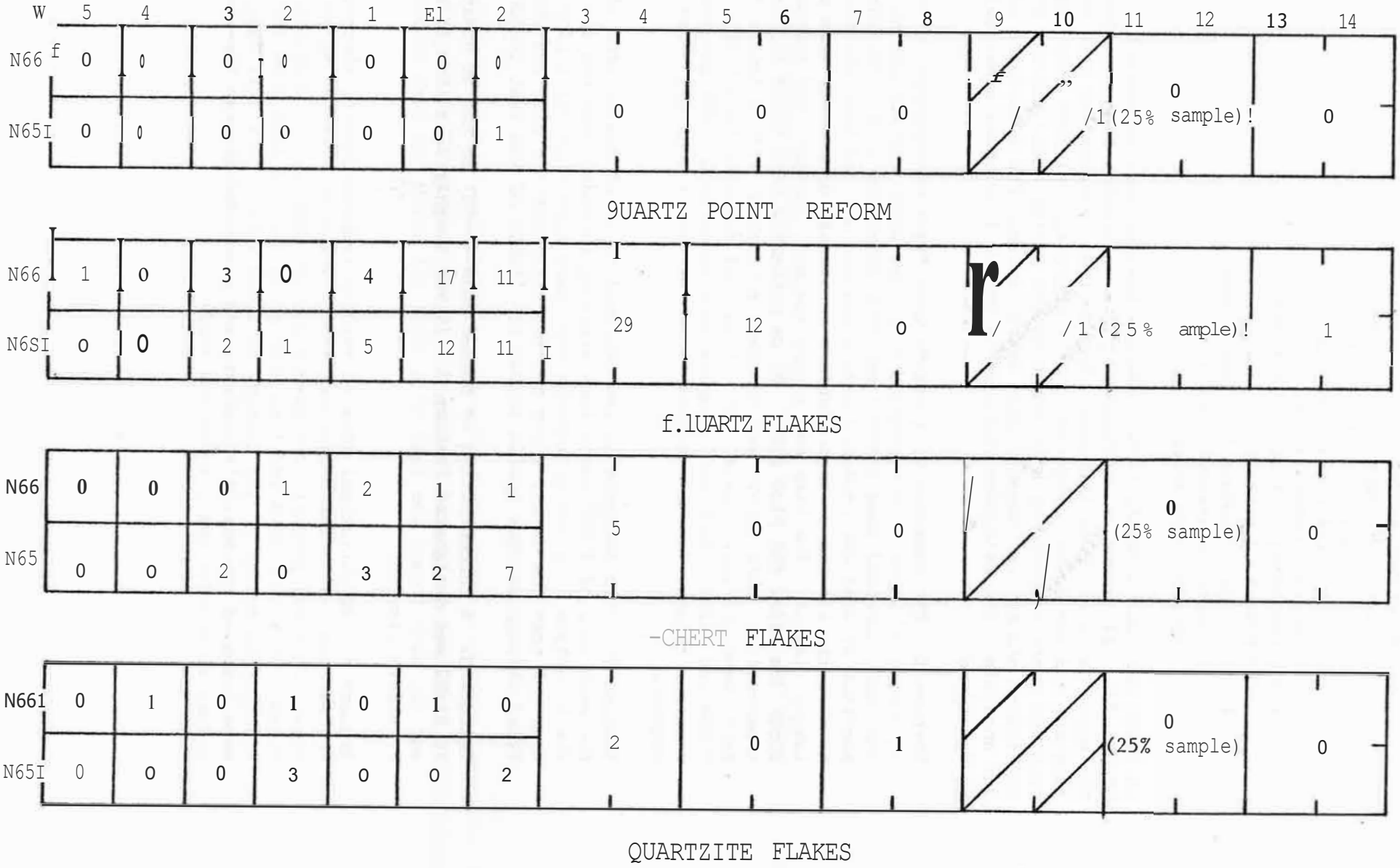


Figure 60. Distributions of Bone, Pottery, Fire Cracked Rock and Historic Artifacts: VT-FR-134, Trench 2.

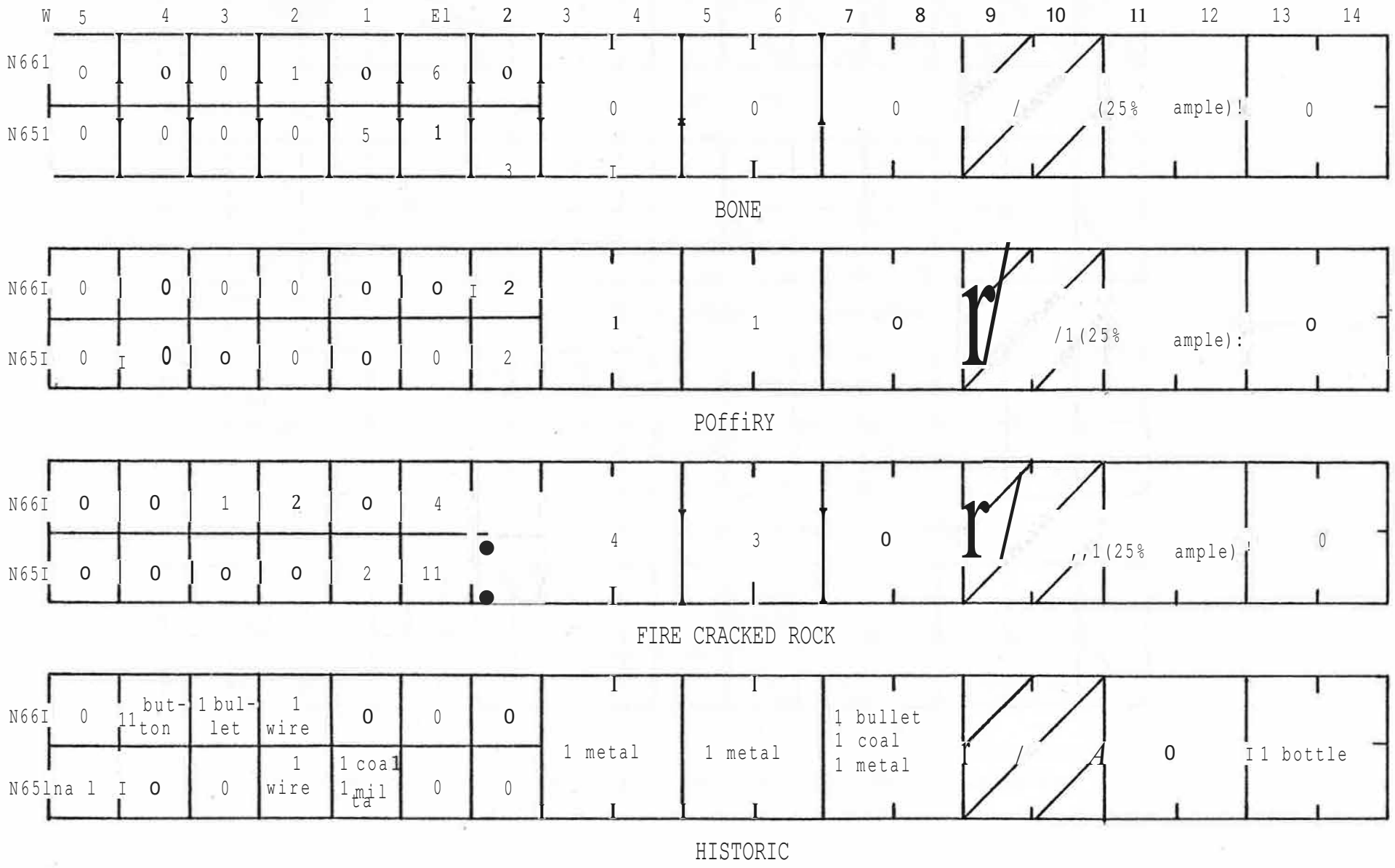
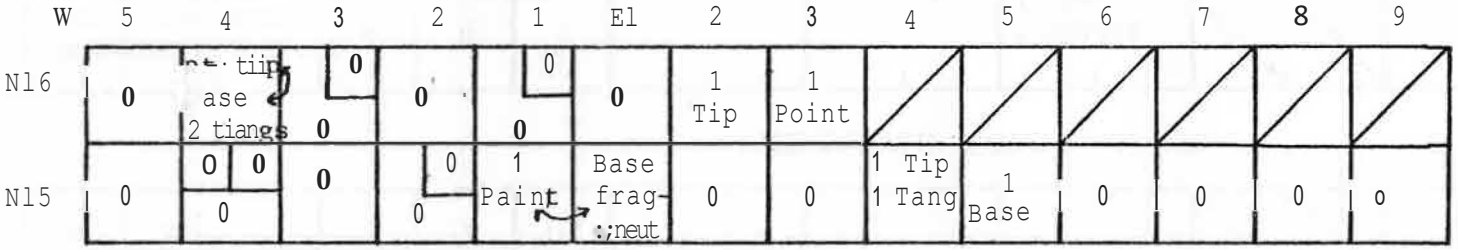
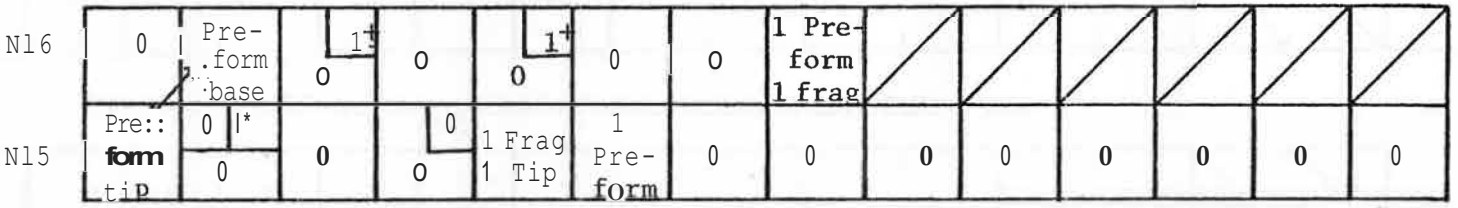


Figure 61. Distributions of Chert Artifacts and Features, VT-FR-134, Trench 1.

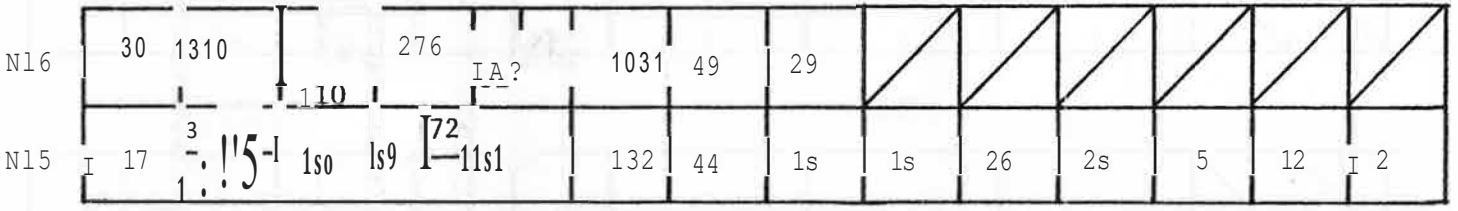


CHERT PROJECTILE POINTS OR POINT FRAGMENTS



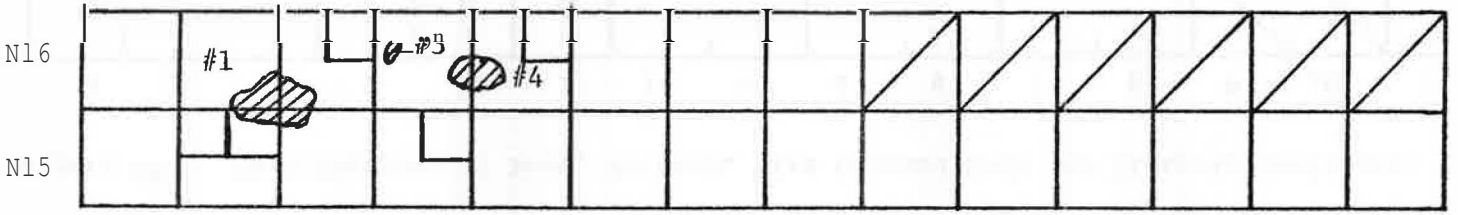
+ Frag
* Mid-section

CHERT BIFACE FRAGMENTS OR PREFORMS



*includes 1 jasper flake

CHERT FLAKES



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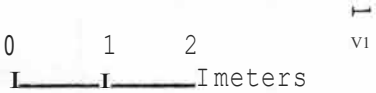
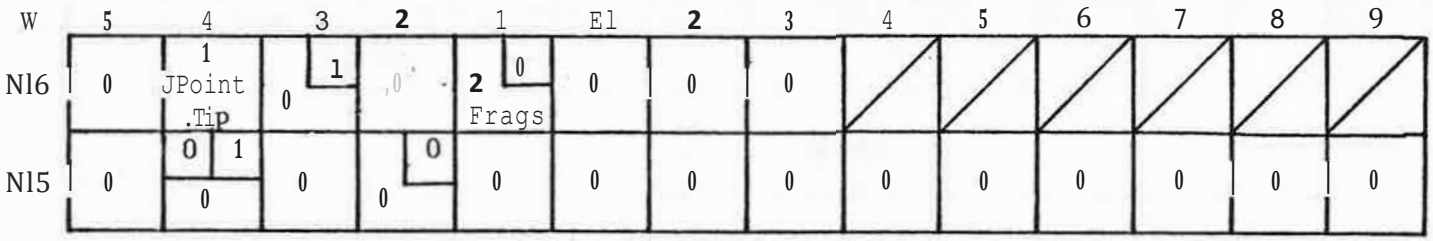
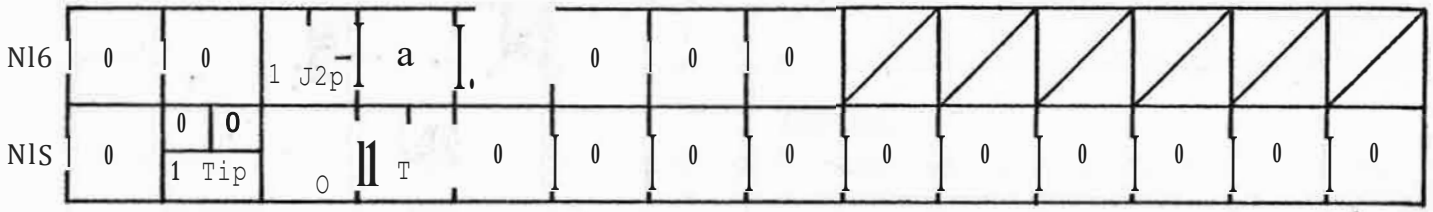


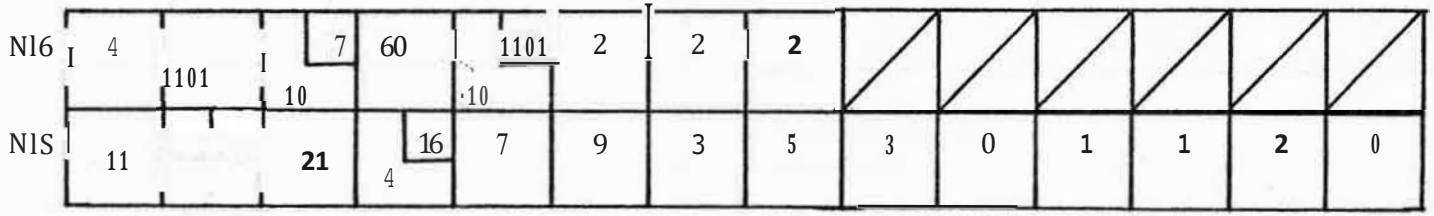
Figure 62. Distributions of Quartzite Artifacts; VT-FR-134, Trench 1.



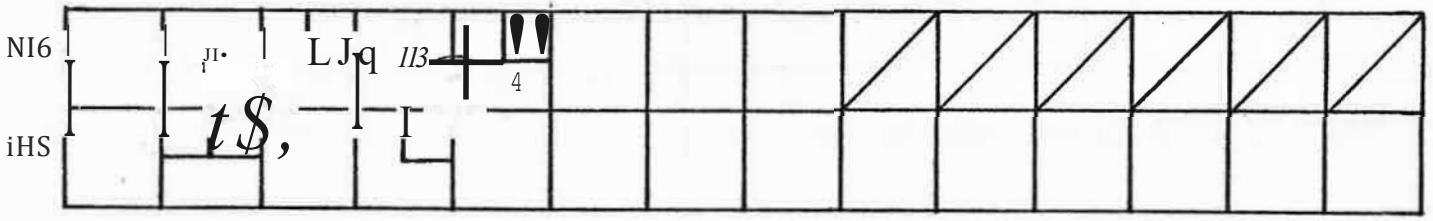
QUARTZITE PROJECTILE POINTS OR POINT FRAGMENTS



QUARTZITE BIFACE FRAGMENTS OR PREFORMS



QUARTZITE FLAKES



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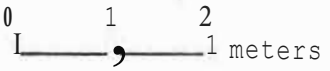
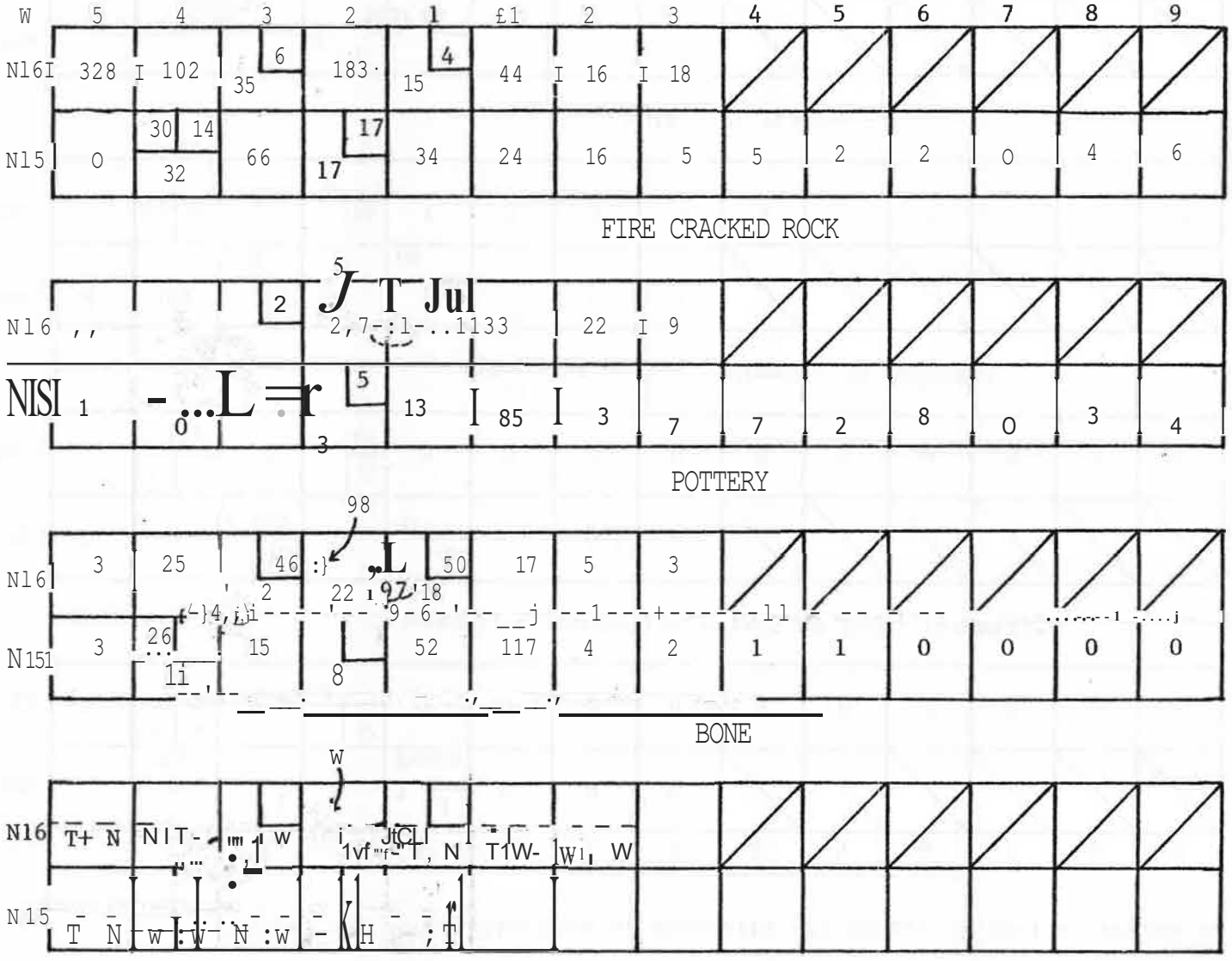


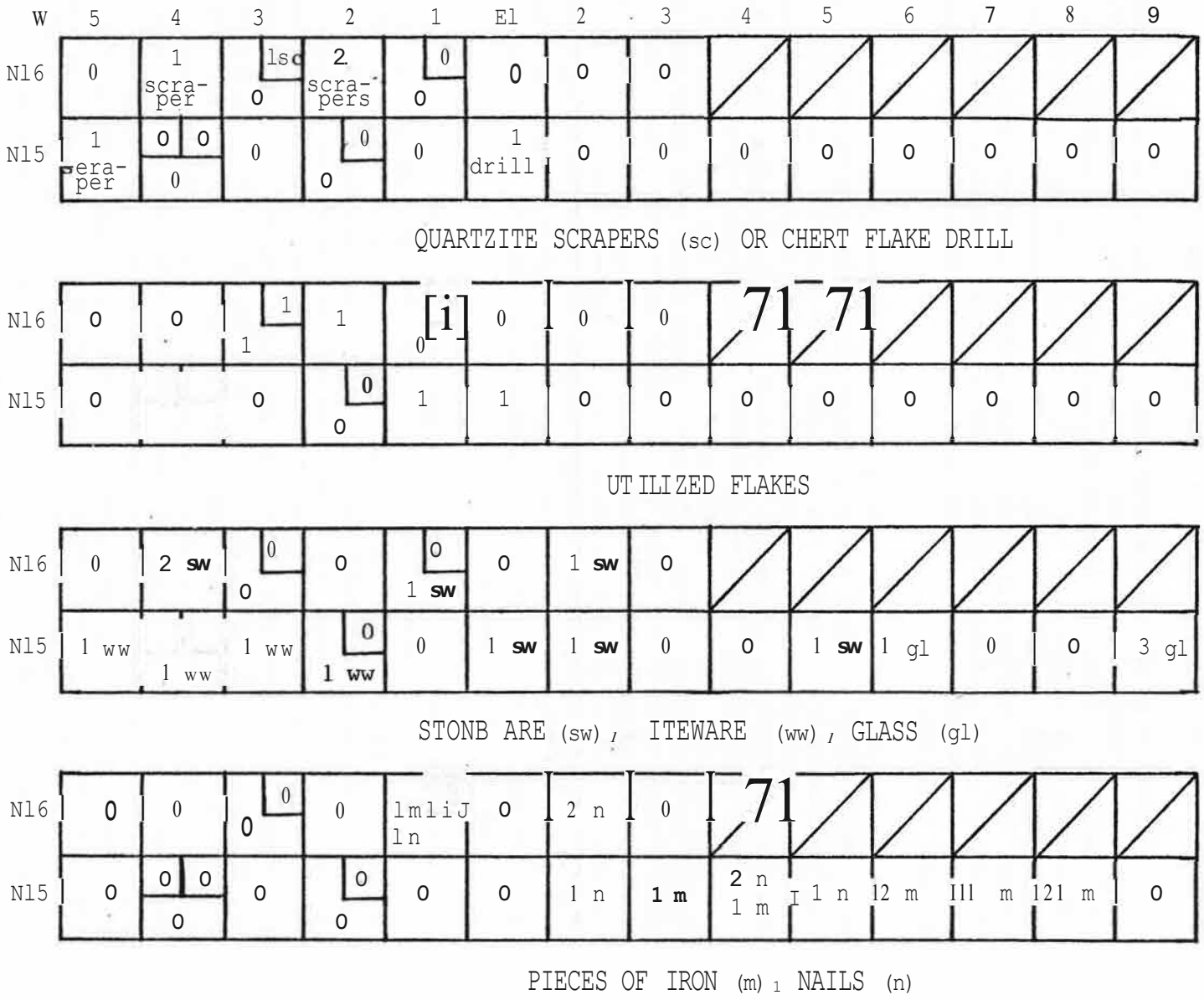
Figure 63. Distributions of Fire Cracked Rocks, Pottery, Bone and Phosphate Readings: VT-FR-134, Trench 1.



meters

Dashed lines indicate features 1, 3 and 4.

Figure 64. Distributions of Scrapers, Drills, Utilized Flakes and Historic Artifacts: VT-FR-134, Trench 1.



In the section of this report entitled "General Sampling Approaches", the problems with using gross horizontal controls in trenches to reconstruct distributional patterns of artifacts have been discussed. By using small test units within some portions of Trenches 1 and 2, better distributional resolution was achieved and general clusters of lithic flakes, stone tools and hearths have been identified. These clusters appear to represent focal areas of projectile point manufacture, tool maintenance and cooking. Much tighter horizontal control, and thus much better pattern recognition, could be achieved with only slight modifications in excavation techniques.

Figures5Cr64 depict the distributions of various artifact classes which were recovered in Trenches 1 and 2. (Aside,from looking at the size ranges of flakes and determining the types of raw materials which are present, no analysis of the lithic artifacts has been completed due to time and funding limitations.) A brief review of the distribution figures indicates a considerable difference in the density of various artifact classes between Trenches 1 and 2, as well as marked changes in the horizontal distributions of artifacts along the lengths of both trenches.

In Trench 2 there is a focus of all artifact classes in a 2 x 2m unit (N65/66El/2), with a rapid decrease within 4m to either side (see Figures 59 and 60). Between the disruption produced by both modern plowing and rodent burrowing, particularly in N65El/2, it is impossible to identify specific activities. However, the overlapping distributions of burned bone, pieces of broken pottery and fire shattered rock, in conjunction with increased levels of charcoal in the soil suggest a hearth used to prepare food. The only identifiable bone consisted of small fragments from the lower leg of one or more deer. Near the hearth, a triangular preform indicates that a projectile point was in the process of being produced from a quartz cobble (see Plate II, top right). It was apparently discarded because it could not be sufficiently thinned. The final reduction of other points from preforms which had been brought to this spot is also suggested by the low frequencies of chert and quartzite flakes.

In some respects the limited range of activities which can be reconstructed solely from the artifacts in Trench 2 are not unlike those which were carried out at sites downstream, such as VT-FR-103 or 104. On the other hand, when compared with such sites, appreciable increases in the quantity of tools and flakes, as well as the number of hearths recorded in Trench 1, are evident. In Trench 3 at VT-FR-103, for example, 174 chert flakes were recovered from 28m^2 (see Figure 21); in Trench 1 at VT-FR-134, 2,056 flakes were recovered from only 22m^2 (see Figure 61). Numbers of quartzite flakes jump from 4 at VT-FR-103 to 327 at VT-FR-134 and increases of a similar magnitude are noted for other artifact classes. Even the levels of phosphate derived from the soil samples are consistently high in areas of VT-FR-134 where artifacts cluster (see Figure 63), yet at sites located along the river at VT-FR-103 phosphate levels were so low that they failed to register. Thus, the data from VT-FR-134 leads to the conclusion that there was a significant increase in the overall level of activity which occurred at this site when compared with sites along the south side of the river downstream.

Based on the changes in frequencies of chert flakes in the 1m units dug along the length of Trench 1, in conjunction with the distributions of broken chert projectile points, as well as the preforms broken in the process of becoming points (see Figure 61), it is apparent that at least three small lithic workshops were partially exposed between W4 and El. Others may exist as well. At least two episodes of point manufacture from quartzite are suggested by flake peaks in N16W4 and N16W2 and by the presence of broken points and bifacially worked quartzite pieces in adjacent pits (see Figure 62). In instances where either chert or quartzite was being used as a raw material, the infrequency of large primary reduction flakes or flakes with a weathered cortex indicates that preliminary testing and reduction of the raw material usually took place elsewhere--perhaps along the river where suitable cobbles could be found in the streambed or at some bedrock source. Along with the workshop debris, five quartzite scrapers were also recovered at the western end of Trench 1 (see Figure 64). Their steep bit angles and the heavy crushing along their edges suggest that they were employed to prepare bone or wooden items--activities which are consistent with preparing a hunter's tool kit.

Finally, an analysis of the bone which was derived primarily from the features or from adjacent 1m units in Trench 1 broadens the interpretive potential of this site. Conclusions are based on the review of over 1,000 bone fragments, all of which are smaller than 1/2 inch; all but a few have been burned. Less than 5% of the sample could be identified (see Figure 65).

The most frequently identified bones are those of deer, especially those bones in the lower legs. First, second and terminal phalanges (the toes bones), metacarpals and metatarsals and those in the complex of carpal and tarsal bones make up over 95% of the sample. As far as can be determined the upper legs, pelvis, skull and scapulas are not represented; one rib and one vertebral fragment were identified. The presence of these latter bones, in conjunction with the lower leg bones, suggests that one or more deer were butchered on-site.

One terminal phalange (the hoof cone) and several of the carpal bones are very small. Although some shrinkage is expected when bones are burned, these bones are roughly 10-30% smaller than those of a 6-month-old deer skeleton used for comparative analysis. This suggests that a young deer in the 4-6 month age range was taken. If so, then this also suggests at least a late summer-early fall period of activity around this one feature at the site.

The question arises as to whether the deer were butchered and consumed primarily on-site or whether the more meaty portions were transported elsewhere. Stated another way, were people in residence at VT-FR-134 for an extended length of time or did the site fnnction as a transient camp where game was butchered by a large hunting party before being taken to a larger settlement? The answer would seem to lie in the types of bone which were recovered. Because the bulk of edible meat on a deer is on the fore and hind quarters, one would expect that if carcasses were

Figure 65. Identified Bone Recovered at VT-FR-134.

Testing Area/ Sampling Unit	Catalog No.	Species	Bone Description
Trench 1			
N15E1	441-11	Deer (very yourig indiv.- 2-4 mons.)	Skull frag, long bone frags, 1 3rd phalange
N15E1	442-4	Probably deer	Long bone frags
N15E2	528	Deer	Metapodial, distal epiphysis
N15E5	446-4	Deer	Sesamoid frag
N15E9	450-5	Deer	Possible carpal frags
N15W1	357	Deer	Rib frag, mostly shaft frags, 1 possible metapodial frag
N15W2	439-8	Deer	6 long bone frags
		Deer (young- 4-6 mens)	2 carpal frags
N15W2NE	415	Deer	Possible carpal frag
		?	Shaft frags
N15W2NE	419-2	?	Tooth enamel
N15W2NE	419-3	Deer	Vertebrae frag, sacral
N15W3	319	Deer range	Long bone frags
N15W4	436-4	?	Long bone frags, possible skull frag
N15W4NE	401	Deer range	Long bone frags
N15W4NW	432-6	Probable deer	Tooth enamel
N15W4NW	434-1	Deer	Possible long bone frags
N15W4NW	434-2	Deer	Phalange, distal end
N15W4NW	435	Deer (young)	2nd phalange, distal end
N15W5	308	Deer range	Long bone frags
N16E1	405	Deer	13 shaft frags; phalange, proximal end; metapodial, distal end: styleform
		Possible bird	?--1 frag
N16E2	443-5	Deer	Carpal frag, metacarpal frag
N16W1	440-1	Deer	2nd phalange, epiphysis
		Large mammal-- deer range	Long bone frags
N16W2	344	Large mammal-- deer?	Shaft frags
		Deer	Phalange frag
		Deer (4-6 mons)	Carpal

(continued)

Figure 65 (continued). Identified Bone Recovered at VT-FR-134.

Testing Area/ Sampling Unit	Catalog No.	Species	Bone Description
Trench 1.			
N16W2	358-6	Possible fish Deer range	Spine Probable vertebral £rags (2)
N16W2	358-7	Bird? May be squirrel size mammal	?
N16W2	348-3	Probable fish Small mammal	Spinal process 1 shaft £rag
N16W3	438-4	Possible fox	Phalange £rag
N16W3NE	522-2	Large and medium size mammal	Shaft £rags
N16W3NE	522-4	Turtle	Carapace frag
N16W4	325	Deer	Metatarsal, medial section; metacarpal, proximal epiphysis £rags; long bone shaft frags
N16W4	338-4	Turtle	?--1 piece
N16W4	341-3	Deer	Metatarsal, medial frag
N16W4	341-4	Chipmunk	Calcanium
N16W4	359-4	Medium size mammal	Tooth roots; vertebral frags
N16WS	303	Deer range	Long bone frag
Trench 2			
N65E2	164	Deer range	Long bone frags
N65W1	135	Possible dog	Phalange, distal end
N66W4	103	Immature cow	Tooth

to be transported for any distance, they would be gutted and the lower legs, skull, central vertebrae and ribs might be discarded at a butchering site to reduce the weight. The upper legs., scapulas and portions of pelvis which act as the primary muscle attachments are likely to be carried away. On the face of it, the presence of phalanges, metapodials, carpals and tarsals, rib and vertebrae, to the exclusion of other bones at VT-FR-134, would seem to fit the expected bone disposal pattern of a short-term hunting and butchering site, with the bulk of the meat being consumed elsewhere.

Other patterns do not fit with a functional interpretation of VT-FR-134 as a transient hunting-butchering site. First, aside from the deer bone which was identified, the presence of chipmunk and turtle carapace (probably snapping turtle) is certain. Based on thickness, bone fragments from medium-sized mammals in the raccoon/woodchuck range are also present, as is one bone which probably derived from a large bird. Several fish sp-i'ne:shave probably been recovered as well. In addition to the bone, charred butternut shells were found in the flotation samples. Thus, a diversified subsistence base is apparent. Second, the fairly broad scatter of pieces of broken pottery, chert and quartzite flakes, scraping tools, a number of projectile points, along with other points which were broken during the process of manufacture,would argue for greater permanency. Third, simple ,butchering in the field would not account for the fact that all the lower leg bones are burned. Because there is little to no nutritional value in these bones, aside from very small quantities of marrow, the fortuitous disposal of these bones into a camp fire following a meal seems unlikely.

How can these conflicting patterns be reconciled? As an alternative interpretation, it is suggested that the lower leg bones of individual deer (those sections below the radius/ulna and tibia) were "ritually" burned in a hearth where they had been intentionally placed in recognition that the spirit of the deer had allowed itself to be taken by a hunter. (By ethnographic analogy, such treatment of animals is not unlikely in the Northeast. As illustration, skeletons of beaver were not allowed to be eaten by camp dogs ,. but were thrown back into the river by Montagnais hunters so that they could stay on good terms with the beaver spirits.) The remaining portions of the deer skeleton could be dealt with in other ways. For example, the upper leg bones could have been stewed and perhaps broken for marrow extraction. Once the meat had been consumed, the bones could have been simply broadcast on the edges of the camp or given to the dogs. Given the acidic nature of New England soils, any fragments of bone treated in this manner would generally not have survived.

General Inferences and Conclusions

As a working model derived from the limited 1982 field sample, it is proposed that VT-FR-134 functioned during the late Middle Woodland as a base camp from which an extended sunnner-fall exploitation of the local environment was carried out. As such, this site represents a functional class of sites which is distinctly different from those encountered in

the downstream portion of the Highgate Falls Prehistoric Archaeological District, such as VT-FR-103, 104, 105, 130, 151. 152 or 153.

The sampling completed to date indicates that VT-FR-134 has the potential for yielding substantially more information directly related to these and other topics. Although the site has lost some integrity due to historic plowing, the distributional diagrams presented in Figures 59 - 64 clearly indicate that a tight- -patterning of lithic artifacts still exists in both Trenches 1 and 2. Bone concentrations in Trench 1 focus between W4 and E2--a distance of only 5m or 16 ft--and the greatest number and variety of identifiable bone was recovered either in or immediately surrounding remnant hearths. Aside from a single sesamoid from a deer, only very small fragments of bone were encountered outside this area. The point to be made is that even though the site has been plowed, the remains of cooking activities are still tightly clustered. Hearths in other portions of the site are likely to have been less affected by plowing. During the 1980 survey, for example, a hearth was noted in Test Pit 4 which clearly extended below the plow zone. Further excavation of such features could yield a broader interpretive sample, and comparisons of plant and animal food remains within discrete clusters across the site could provide important information about seasonality, the range of subsistence resources which were procured, and, thus, variations in human diet. For these reasons, further data recovery is recommended in order to obtain a more reliable sample from that portion of the terrace which lies just to the south of Trench 1, as well as between Trenches 1 and 2. This constitutes a surface area of approximately 10 x 60 meters.

GENERAL SUMMARY AND CONCLUSIONS

Background Statements

In 1980 an extensive reconnaissance survey was conducted within the Highgate Falls Hydroelectric Project area. Because of the high density and broad geographical distribution of prehistoric sites, the entire hydroelectric project area appeared to be a culturally significant unit of study. Documentation to determine eligibility of the Highgate Falls Prehistoric Archaeological District to the National Register of Historic Places was prepared by the Vermont Division for Historic Preservation. In April, 1982 the District was determined to be eligible for inclusion on the National Register. The District boundaries encompass all of the hydroelectric project area between Highgate Falls and East Highgate, Vermont.

As noted in the District nomination,

> The Highgate Falls Prehistoric Archaeological District is significant because it contains a range of prehistoric occupation/activity areas (in terms of size, structural complexity, data classes and topographic location) that have the potential of yielding information on spatial, functional, seasonal and temporal relationships among Woodland /and probably Archaic period/ sites within a geographically restricted, environmentally homogeneous zone. The potential for understanding site differences and similarities (in function, site structure, season of use, size and temporal affiliation) within this limited stretch of riverine environment is great.
>
> As a single unit of study, the District provides a cohesive, comparable body of data for evaluating similarities and differences in individual sites and site concentrations among environmentally distinct segments of the Missisquoi valley. With time and through analyses of site clusters in different stretches of the watershed, information on human population **size**, on the **size** and characteristics of annual and seasonal exploitation territories, on seasonal activities and on trade and socio-economic '.networks utilized and maintained by past societies can begin to be compiled.

On the basis of what had been learned from the 1980 survey, it was expected that a detailed evaluation of all the sites which had been identified (see Figure 2) would be very expensive. Furthermore, more than 70-90% of the project area had not been sampled at all to determine the presence or absence of prehistoric sites. To obtain such a sample would be financially prohibitive. For these reasons, the 1982 intensive site evaluation program was greatly restricted. Site evaluations focused on a small number of what were believed to be prime archaeological areas in the upstream, middle and downstream portions of the project area.

There are several consequences that resulted from limiting the scope-of-work which should be recognized. First, although the 1980 reconnaissance did provide a 5.5% sample of the surface area within the project

boundaries, 70-90% of the District remains untested. Any archaeological sites which exist in such areas will remain unidentified. For this reason, quantitative statements about the density of prehistoric sites along this segment of the Missisquoi River can be made only with a minimal degree of confidence. Statements related to the size range of sites, the diversity of cultural data which are present, and the temporal range of sites within the District must remain somewhat equivocal. Second, a numer of identified prehistoric sites, such as VT-FR-105, 106, 130, 131, 132, 133, 151, 152 and 153, received no further evaluation. Thus, although the identification of these sites has produced some general comparative data about where sites are likely to be located in the District, cultural data about prehistoric communities which these sites contain will not be available for study and interpretation. In light of these factors, those sites which have been evaluated take on added significance, because they represent only a small fraction of the sites which are present within the Highgate Falls Prehistoric Archaeological District.

As indicated in a previous section of this study, the significance of any specific archaeological property within the National Register District is determined primarily by the information it contains about the environment, human behavior, and cultural change and stability in the past. If significant information is present, then serious consideration must be given to site preservation, or to developing a data recovery plan before such a site is destroyed as the result of expanding the hydroelectric facilities at Highgate Falls. In order to deal with these subjects, it was essential to identify what types of information a selected group of sites within the District contained. This became the goal of the 1982 intensive site evaluation.

Archaeological resources may be divided into three major categories: items--things which are referred to as artifacts, but also include bone, flakes, pollen, seeds, etc.; deposits--which generally applies to lenses or fill in various features such as hearths or storage pits; and surfaces--which are "living" or "occupation" levels which may be vertically separated by noncultural soil units. Furthermore, all of these resources exist in a three-dimensional context of form, time and space. It is the qualitative and quantitative differences among these categories which allow the archaeologist to make and test inferences about past human populations. (See Figure 5 for further detail.)

There are two additional properties of variation in archaeological resources. The first is clarity, that is, the degree to which archaeological deposits or "living" surfaces can be isolated from one another. The second property of variation is integrity, that is, the the degree to which archaeological resources have been preserved.

The archaeological work conducted in 1982 was designed to determine the probable artifact and feature content, vertical structure, temporal affiliation, size, clarity and integrity of site areas which are present within Tracts 1, 4, 24, 27 and 28 (see Figure 4 for location of these tracts within the project area). To a large extent, efforts have proved successful, and for some site areas inferences have also been drawn about the types of activities which appear to have been carried out, the possible function of the site, and probable season(s) of occupation. It must be pointed out, however, that such interpretations are very preliminary.

Although the intensity of sampling at VT-FR-134 did reach 2.5%, samples from most site areas are far less than even 1.0%. A summary of the data classes and site characteristics is .presented in Figure 66.

To a large extent, the range of features and artifacts which are recorded for each site area is dependent on the level of sampling which was completed. At VT-FR-103, 104 (low terrace portion), 140 (low flood plain and western edge of terrace areas), and 134, for example, samples approached 0.5-2.5% of the surface area and general inferences about site contents can be made. For other site areas, such as the high terraces at VT-FR-104 and 140 and VT-FR-139 (which was only surface collected), sample sizes range well below 0.5%. In such cases, other data classes are almost certain to be present. This is particularly true for areas defined by scattered, isolated 50 x 50 cm test pits on the old riverine terrace at VT-FR-140.

The clarity of information at a site has been judged to be poor if artifacts are so unfocused that it is impossible to determine if one or more occupations are represented; good if some focusing of activities is indicated but test pit samples reflect no breaks between such areas; and excellent if discrete areas are isolated from one another. The integrity of archaeological deposits at a site has been designated as poor if all artifacts and features are homogenized in a modern plow zone to the extent that no features or tight artifact clusters can be identified; good if artifacts and features exist both below the plow zone and in a plow zone context where plowing has been so minimal that features and artifact clusters can be identified; and excellent if artifacts and deposits exist below a plow zone and no major natural disturbances are evident.

Conclusions

Intensive site evaluations carried out at VT-FR-103, 104, 134 and 140 (within Tracts 1, 4, 24, and 28, respectively), in conjunction with the data obtained in 1980 during the preliminary evaluation, allow us to make a number of conclusions concerning the physical and temporal characteristics of prehistoric sites which lie within the project area. Several conclusions are briefly stated below.

1) A series of C-14 dates derived from buried logs associated with old river channel deposits which underlie VT-FR-140 (Tract 28) indicate that the high riverine terrace was established by at least 8000 years ago and that the low flood plain adjacent to the river formed between approximately 7000 and 5000 years ago. Similar geomorphological profiles at VT-FR-103 (Tract 1) and VT-FR-134 (Tract 24) imply that these flood plain environments formed by 5000 years ago. This period of 5000-7000 years ago was apparently one of major flooding. The local plant comrm.mity included white cedar, hemlock, maple and beech. After this period of flood plain formation, the river apparently became entrenched in its current channel. Subsequent flood scouring and therechannelization of the river through Tract 1 are also recorded.

It should also be noted that a very limited recovery of datable logs has contributed significantly to what is known about the natural history of this portion of the Missisquoi watershed. There is the potential for greatly expanding this data base by recovering a more complete series of logs within Tracts 24 and 28 where they are known

Figure 66. Archaeological Characteristics of Sites Within the Highgate Falls Prehistoric Archaeological District.

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+ Ap indicates plow zone

to exist. Not only would an extended series of C-14 dates obtained from these logs add to our understanding of how the river system developed, but these logs, in conjunction with the geomorphological data, offer valuable insights into past climatic fluctuations. The excellent preservation of these logs also make them suitable as macrofossils for determining the composition of past plant conununities and for developing a floating but extended dendrochronology sequence for this portion of the Northeast.

2) The geomorphological information and radiocarbon dates suggest that there is no environmental reason why prehistoric sites dating after 5000 B.C., and particularly after 3000 B.C., could not be found within the flood plains or low terraces within any tract. Nevertheless, current evidence points to an intensive use of these low physiographic areas only after about A.D. 700 (i.e. during the Middle and Late Woodland periods). Woodland period archaeological deposits were identified along the river at VT-FR-103, 104, 134, 139 and 140. A C-14 date of 1180 ± 90 B.P. (A.D. 770) was obtained from a cooking hearth at VT-FR-140. Evidence of earlier occupations was not encountered in the thick alluvial deposits exposed in the walls of the trenches excavated at these sites, but several test pits dug on the lowest portion of the flood plain did identify cultural material at depths of 75-90 cm below ground surface. The characteristics of such deposits are unknown.

3J At least two clusters of archaeological material dating to a probable pre-Woodland period were identified. These are located on slightly higher terraces which border the flood plain and low terrace at VT-FR-104 and 140. No unequivocal diagnostic artifacts were recovered which could pinpoint the age of these sites, but a temporal range of 8000 to 4000 years ago is anticipated. If this hypothesis is correct, then there appears to be a clear association between low-lying physiographic areas and Woodland period occupations and higher alluvial terraces and Archaic period sites.

The geomorphological data strongly suggest that such Archaic period sites are likely to exist only in Tracts 4, 8, 27 and 28 where old land forms occur. For this reason, the western portion of Tract 27 (VT-FR-139) and the high terrace in Tract 28 (VT-FR-140) warrant special attention. Within VT-FR-140, the recovery of artifacts in a subplow zone context in four distinct areas on the high terrace--Transect 4, Test Pits 3 and 5, Trench 2 Extension, N45W80 and Test Pit 83--implies that the locations of a number of Archaic period sites have been identified.

4) Although the sites located in the flood plains or on the lower terraces.at. VT-FR-103,104, 134, 139 and 140 appear to be roughly contemporaneous, dating from·approximately A.D. 700-1300, they exhibit considerable variability in size, content, artifact/feature density, seasonality of occupation. For these reasons, many identified sites are not functionally equivalent. Rather, they exemplify different functional classes of sites which reflect the variability in Middle-Late Woodland period settlement systems. Tentatively, fairly transient camps (VT-FR-103, 104), seasonal base camps (VT-FR-134 and 140), and extended residential camps (VT-FR 140) are thought to exist

within the District. On the higher terraces, a number of Archaic period sites are also known to exist. Thus, there is the added opportunity to evaluate the similarities and differences between Woodland and Archaic period settlement systems in this section of the Missisquoi Valley.

5) In brief, the 1982 site evaluation program has confirmed that many sites do contain a broad range of environmental and cultural data and that the Highgate Falls Prehistoric Archaeological District does constitute a culturally significant unit of study. It is also apparent that those sites identified within the District offer differing research potential. In some cases, modern plowing, stream bank slurnpage or extremely low artifact densities suggest that, beyond what has already been learned, it would be very difficult to interpret the cultural activities which were carried out at such sites. In other instances, limited plowing or the burial of deposits under flood sediments means that a great deal of additional cultural and environmental information could be gained. Figure 66 identifies those sites where the integrity, clarity, data content and temporal association of the archaeological deposits clearly indicate that significant information could be recovered (see site areas indicated with an asterisk--*). The locations of these areas are shown on Figures 67-70.

6) Because all identified sites in the Highgate Falls Hydroelectric Project area are relatively shallow, preparation of the impoundment for hydroelectric generation, subsequent site inundation and erosion are expected to have a significant adverse effect on all archaeological properties within the District. The in-place preservation of sites by modifying the scope of the hydroelectric project seems to be an unlikely possibility. A preliminary review of all data collected to date leads to the conclusion that at least several subareas within VT-FR-104, VT-FR-134, VT-FR-139 and VT-FR-140 contain environmental and cultural information which could make a significant contribution to our understanding of both Vermont's and the region's prehistory. These areas have been identified on Figures 67-70. Any mitigation, plan which is developed after federal and state agency review of this study will focus on data recovery at these sites.

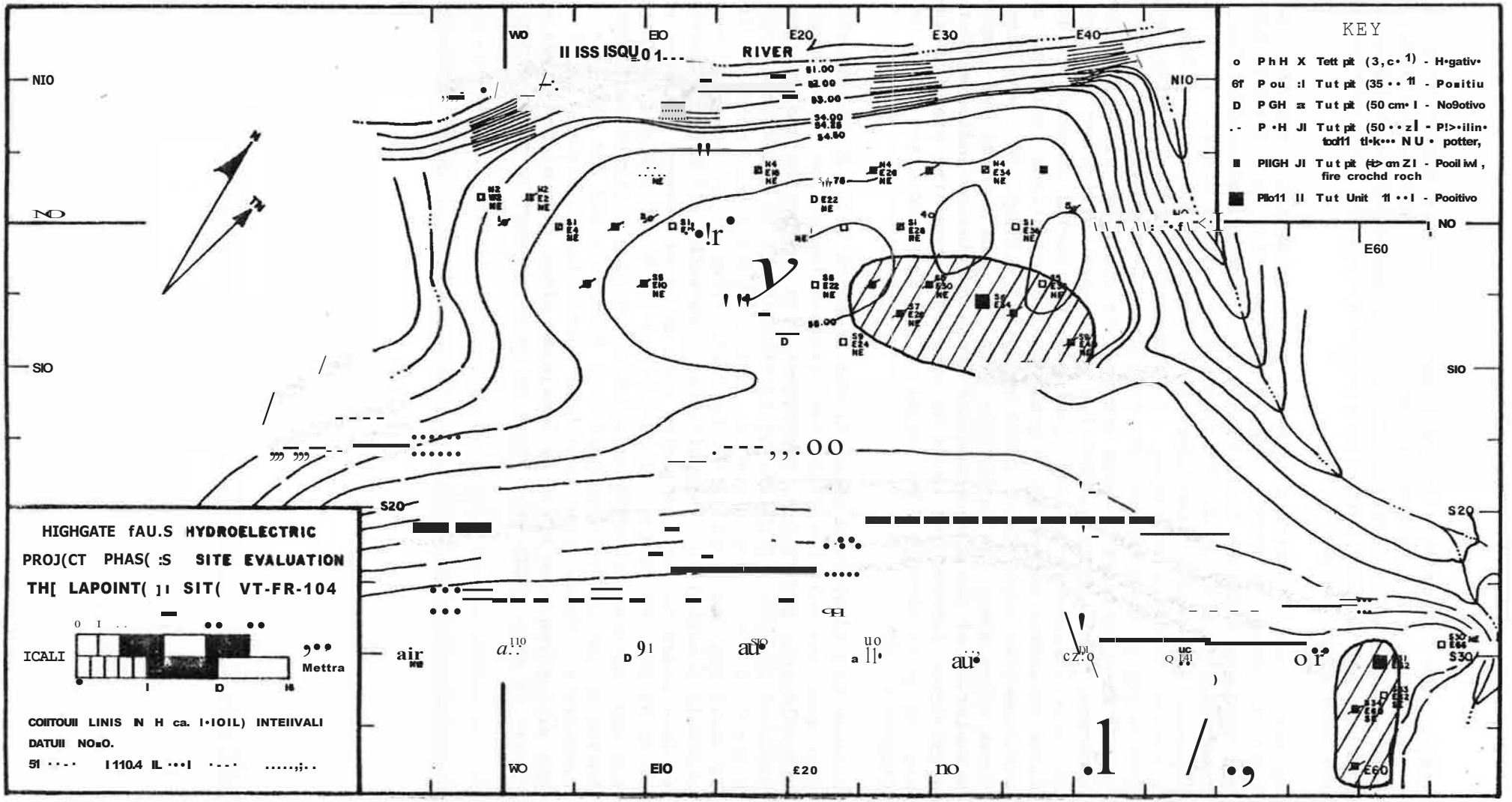

Figure 67. Significant Portions of VT-FR-104 Hhich Warrant Further Study. Significant portions indicated by hatched lines.

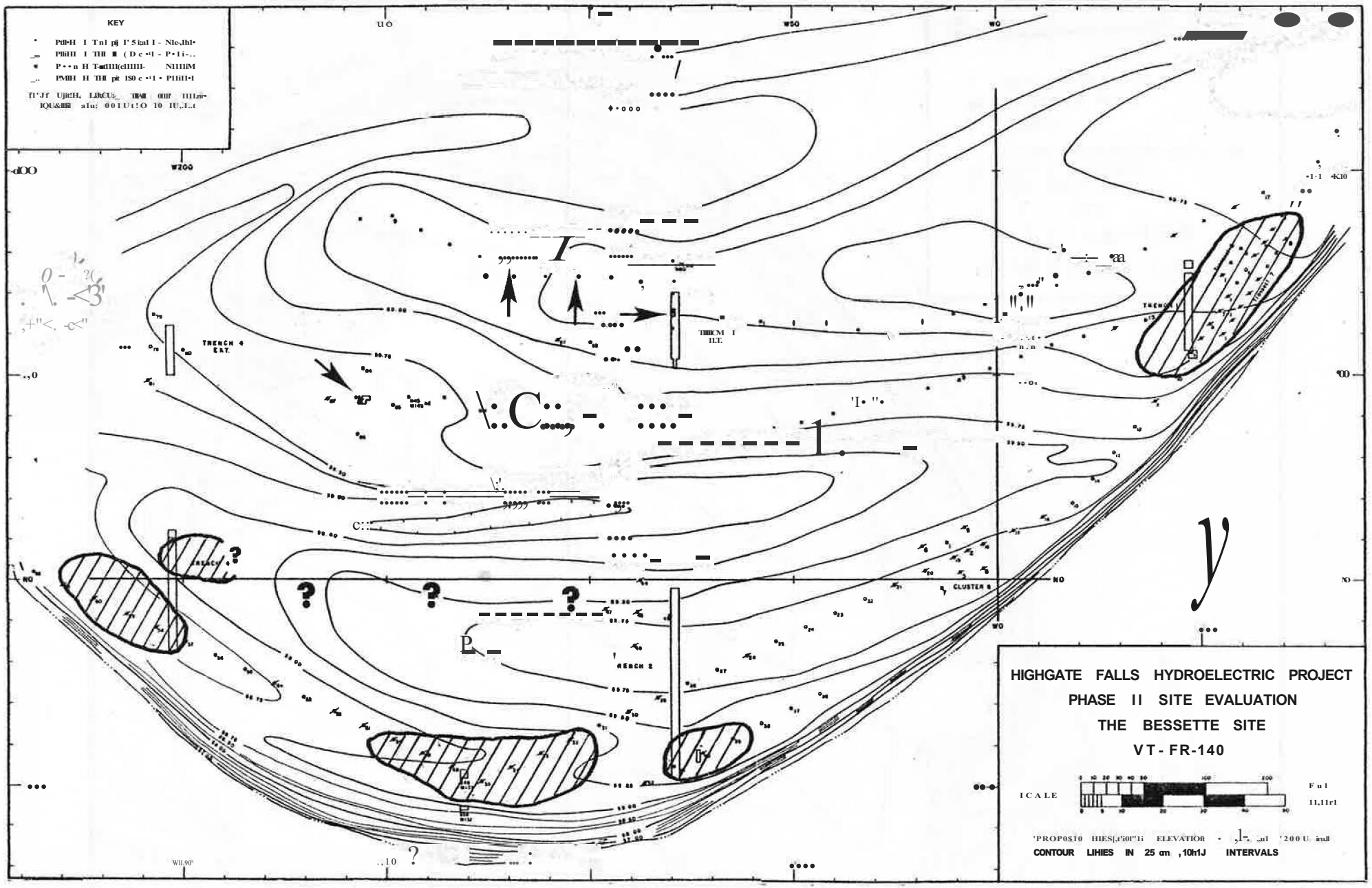

Figure 68. Significant Portions of VT-FR-140 Which Warrant Further Study (indicated by hatched lines) and Sample Areas Which May Warrant Further Evaluation (indicated by arrows). Areas marked with large ? have not been sampled, but the probability of finding sites there is high.

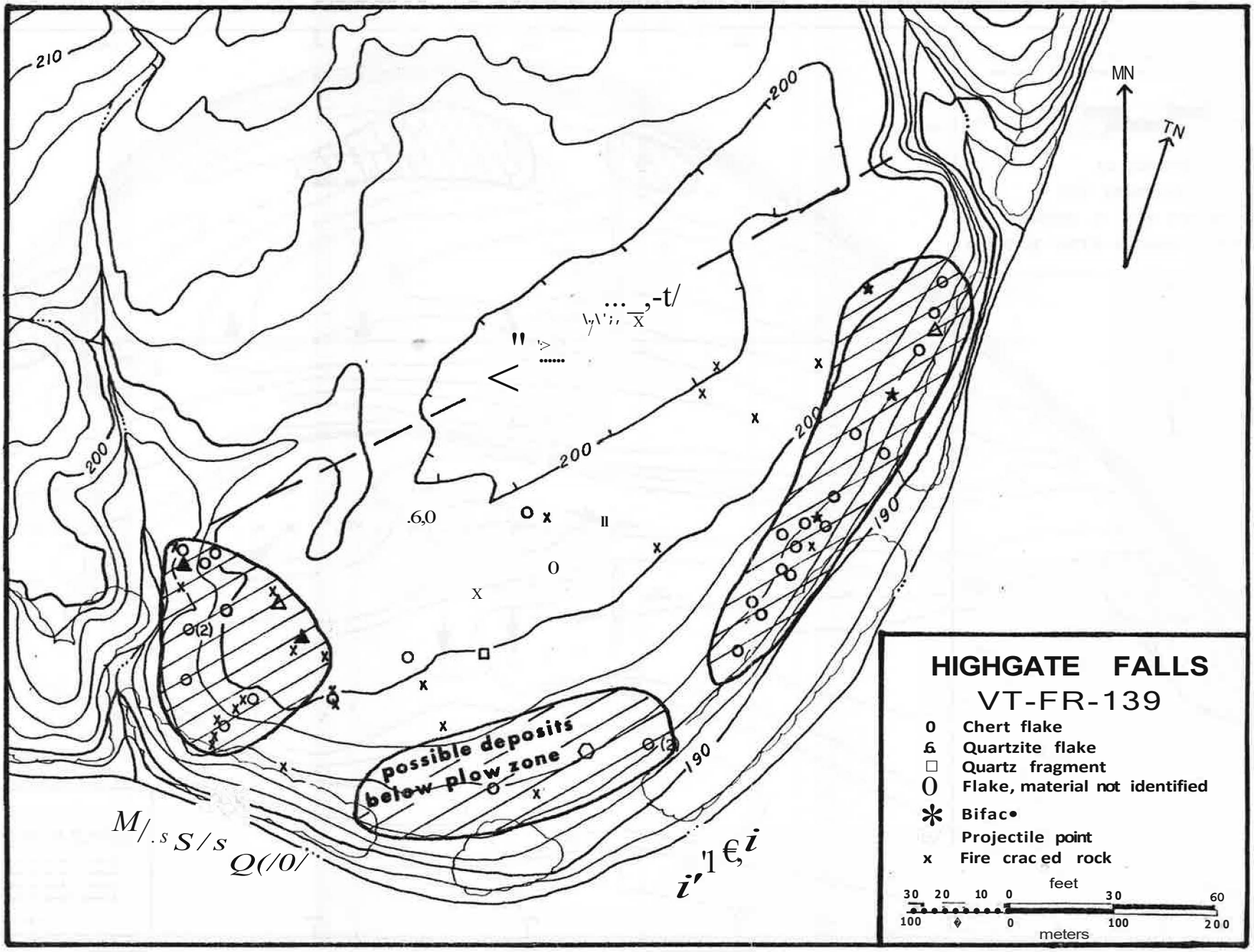

Figure 69. Significant Portions of VT-FR-139 Which Warrant Further Study, indicated by hatched lines.

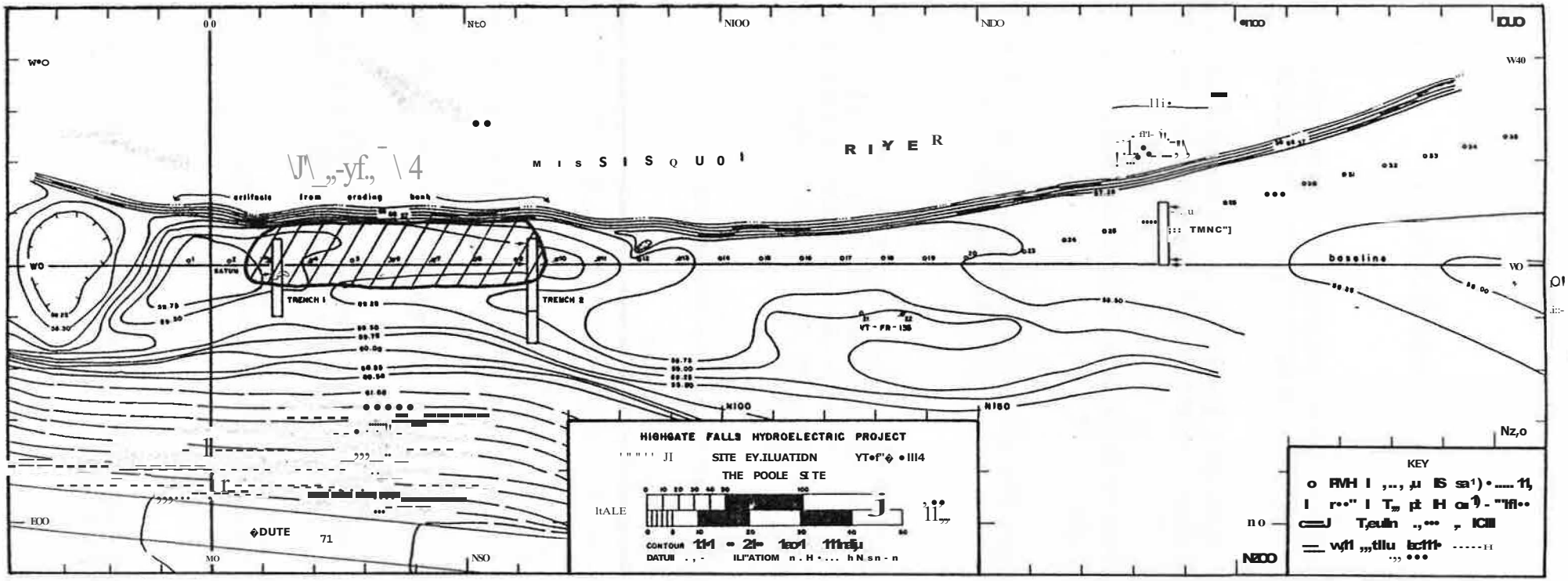

Figure 70. Significant Portion of VT-FR-134 Which Warrants Further Study, indicated by hatched lines.

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