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Exchange, Know-hows, and Interpersonal segmentation: An Assessment of the Archaic component of the Gaudreau (BkEu-8) site, Weedon, Quebec

par

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Résumé

Le site Gaudreau est un site perturbé et à occupations multiples situé dans le sud-est du Québec, et présente des occupations datant du Paléoindien Récent jusqu'à la période historique. Les occupations Archaïques du site, noté par la présence de bifaces diagnostiques de l'Archaïque Supérieur et de l'Archaïque Terminal et par des Macrooutils de l'Archaïque Moyen et de l'Archaïque Supérieur, sont le sujet principal de ce mémoire. Puisqu'aucune occupation ne peut être différencié horizontalement ni verticalement, et qu'aucun objet non-diagnostique ne peut être associé avec certitude, seul un échantillon de 32 objets ont été observés. Étant donné la faible taille de l'échantillon analysé, il est fort probable qu'un plus grand nombre de sources de matières premières aient été utilisés durant les occupations de l'Archaïque. Toutefois, un réseau de matières premières lithiques similaire à ceux des sites du Lac Mégantic a été observé, avec une forte représentation de la rhyolite Kineo-Traveller et des cherts Appalachiens. Des cherts des Grands Lacs et le quartzite de Cheshire sont aussi présents. Le mudstone silicifié d'origine locale et le quartz sont par contre faiblement représentés dans l'échantillon, probablement dû à un biais de proximité de source. L'analyse technique de l'échantillon, sans contrôle pour les pratiques techno-économiques, dénote plusieurs récurrences techniques à l'intérieur des unités typologiques, sans toutefois appuyer des différences récurrentes significatives entre les matières premières de régions différentes. À cause de la taille de l'échantillon et du contexte perturbé, la pertinence des fortes similarités entre certains objets est douteuse. La segmentation interpersonnelle des chaînes opératoires ne pouvait être déterminée dans l'échantillon. Cependant, les résultats incitent plutôt à croire que les matières premières devaient circuler sous diverses formes. Il peut être considéré que, en dehors des matières premières locales, les occupants Archaïques du site Gaudreau n'avaient pas d'accès direct aux matières premières exogènes.

Mots-clés : Archéologie, approche technologique, technologie lithique, Nord-Est Nord-américain, Période Archaïque

Abstract

The Gaudreau site is a disturbed multicomponent site located in Southeastern Quebec, with occupations dating from the Late Paleoindian into the historic period. The Archaic occupations, noted through the presence of multiple diagnostic bifaces forms and macrotools, are the primary subject of this thesis. As no occupations can be isolated horizontally nor vertically, and no non-diagnostic artifacts can be associated with certitude, only a sample of 32 objects were analyzed. As only a small sample of the assemblage was analyzed, it is likely that more raw material source areas were used during the Archaic occupations of the site. Nonetheless, the resulting raw material networks are similar to those of the Megantic Lake region, with a strong representation of Kineo-Traveller rhyolite and Appalachian cherts. Great Lakes cherts are also present, as is Cheshire quartzite. Local silicified mudstone and quartz are weakly represented in the sample, though this is likely an effect of source proximity resulting in the near absence of completed forms made of local raw materials. The technical analysis of the sample, without control for techno-economic practices, denotes many technical recurrences within typological groupings, with no significant and recurring differences between raw materials of different source regions. Due to sample size and to the disturbed context, the significance of objects linked due to similarities in technique is doubtful. Interpersonal segmentation of operational sequences could not be determined, though the evidence appears to point towards the circulation of raw materials in multiple forms. It is to be assumed that, outside of the locally obtained raw materials, the occupants of the Gaudreau may not have had a direct access to any of the exogenous sources.

Keywords: Archaeology, Technological Approach, Lithic technology, Northeastern North America, Archaic Period

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List of abbreviations and acronyms

BPT: Broadpoint Tradition (Terminal Archaic)

calBP: calendar years before present (calibrated)

C.R.L.Q. : *Collection de Référence Lithique du Québec* (Québec Lithic Reference Collection)

MNSS: *Musée de la Nature et des Sciences de Sherbrooke* (Sherbrooke Museum of Nature and Science)

NSPT: Narrow Stemmed Point Tradition (Terminal Archaic)

rcyBP: Radiocarbon years before present (non-calibrated)

"You cannot measure a man by his failures. You must know what use he makes of them. What did they mean to him. What did he get out of them."

Orison Swett Marden

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Introduction

Southeastern Quebec has been occupied continuously during the past 12 000 years, with occupations spanning the near entirety of Northeastern prehistory starting at the Early Paleoindian period (Chapdelaine 2007). The Gaudreau site (BkEu-8) exemplifies this continuity, presenting a palimpsest starting with the Late Paleoindian period and continuing into the historic period (Graillon, et al. 2012). However, site formation does not magically end at 1950: modern and contemporary processes not only add to assemblages, but also alter the framework which is the site in and of itself. Contemporary occupations on the Gaudreau site have seen the replanting of trees on what was once pastures, erosion and shuffling of soils due to poor conditions, and culminating in the partial leveling and banking of the site (Graillon 2013). Sites such as Gaudreau present their lot of challenges to the archaeologist, due to the consecutive reoccupation and repurposing of the site resulting in the superposition and intermixing of distinct assemblages, which in the end creates a non-distinct assemblage. Mixed levels are in this case essentially a non-context, as materials, though found together, have only slightly more relation to each other than surface finds over a large area. Context and relations in this situation are therefore more of a construct by the archaeologist than an archaeological fact. The intermixing of temporally non-diagnostic materials, especially in the case of lithic materials, creates a case wherein meaningful data can be produced following the adjustment of certain key variables, such as temporal context or sample size; either analyze the entire assemblage and create data upon the sum of all occupations, or segment the assemblage along the lines of typology into temporally meaningful units. For all these problems, such contexts provide archaeologists with astonishing time depths for analysis, a character not provided by un-mixed single occupations, allowing for the examination of longitudinal trends rather than precise snapshots (Bailey 2007). Cumulative palimpsests, such as the Gaudreau site, can be used illustrate long term consistencies in the archaeological record.

This thesis wishes to answer the following questions in relation to the Gaudreau site collection: What are the lithic procurement networks in which the Archaic inhabitants of the Gaudreau site participate? Can differences in applied techniques (know-hows) upon finished objects provide insight into the mode of acquisition of the raw materials found within the Archaic occupations of the Gaudreau site? The identification of lithic sources is one step of this process, though it is insufficient alone as a means to determine the presence or absence of social means of acquisition of materials (systems of reciprocity, exchange) as distance-to-source only measures the spatial displacement of objects, not whether the materials change ownership. This is more so in the case of non-complex prehistoric mobile hunter-fisher-gatherers, where cut-off points in mobility and social boundaries remain undetermined. When clear social, cultural, or political boundaries are present, indirect acquisition is much simpler to infer, though individual agencies and cross-boundary acquisition can still be in effect (Gould and Saggers 1985). As attritional objects that record prior gestures and techniques, lithic vestiges can offer information as to how they were obtained. Though densities of flakes and amounts of tools in relation to source distance are classic archaeological indicators used to determine whether or not indirect acquisition is present in a raw material network, these indicators are heavily reliant on the techno-economic choices made by individuals in groups. Controlling for sequence segmentation (Burke 2007b) and the elaboration of gravity models to evaluate the attractiveness of sources versus observed material frequencies are promising (Rorabaugh and McNabb 2014; Wilson 2007b), these methods still however lack the element of ownership.

To this end, the observation of convergences in otherwise divergent (and the opposite) operational sequences of diagnostic lithic artifacts made of raw materials of different source areas is proposed as a means to suggest changes in ownership. The idea of observing discrepancies in techniques to distinguish contributions of different individuals in the production of an object is longstanding (Arnold 1999; Cross 1990; Crown 2007; Gosselain 1998). Observing such discrepancies in a context such as the Gaudreau site evidently presents major caveats: First of these is the absence of control for techno-economical practices, as form in which the objects arrived on site and the exact transformations are unknown, due to the site's palimpsestuous nature which renders associations between objects and flakes tenuous. Second is the over-reliance on typology of this approach, as not only types are archaeological constructs, but untyped or idiosyncratic objects remain unanalyzed due to this constraint. Third, due to in-group exchange, such as forms of reciprocity and demand-sharing, ownership may change even though acquisition of the raw materials may in fact be direct. And fourth, as only the assemblage of a single site is observed, therefore only a single node in the entirety of the potential networks, network-wide dynamics may be unobservable in the results.

The first chapter presents the theoretical framework used, comprising of the theoretical framework relevant to the research question, a discussion of exchange in archaeology, and the material culture of the Archaic period in Northeastern North America. The second chapter presents the archaeological context of the Gaudreau site, which includes its placement in terms of geography and geology, the areas of the site and its contents, and short descriptions of the occupations present on the site. The third chapter presents the methods used in the analysis and the determination of the sample analyzed. Chapter four presents the results of the analysis, including the operational sequences identified among the analyzed vestiges. Chapter five discusses the findings and attempts to resolve issues related to the results and to the caveats outlined above. The final chapter summarizes the findings, discusses research perspectives, and concludes the thesis.

1.0 Theoretical Background

1.1 The anthropology of techniques

The anthropology of techniques posits to analyze material culture (and non-material gestures) as a whole and distinct system within human societies, with interactions within other social systems (Lemonnier 1986). In archaeology, analyses using this approach generally focus on answering questions in relation to the techno-economics of techniques, such as the spatial relations of the phases of techniques between site areas, sites, and raw material sources (ex. Wengler 1991), and questions in regards to the psycho-technical aspects of techniques, such as the process of learning and mastering of techniques (Roux 1991). The concept at the basis of this approach is that of the technique, initially defined by Mauss (1968: 371) as being an “effective traditional act”. This definition has evidently been largely debated and redefined, notably to incorporate innovations and ineffective derivations of techniques (Sigaut 2002). The study of techniques includes the objects themselves, the planning of their production (project and sequence), the knowledge and the know-hows implicated in technical processes, the social contexts of the processes (“who can do what”), and the gestures and movements of the human body during the processes (Akrich 1987; Dobres 1995).

Technical choices, either large scale systemic choices or small scale variation in techniques, are not guided by a desire of optimization, but are chosen through what is known and what is considered to be a proper way of doing things, even if doing so produces less efficient or consistently negative results (Lemonnier 1993). The intrinsic social nature of technical choices makes it so that distinct technical traditions may coexist without overlap at the distance level of households, wherein the opposite techniques and methods used are considered the improper way of doing things (Mahias 1993). Techniques are therefore likely known by both neighbors over the course of regular interactions, and are generally unused, though adoption of the opposite techniques occurs on occasion and is justified in some way or another by the individuals who choose to integrate the said techniques (Roux 2013). As such, technical choices must not simply be viewed in the terms of optimization to a given technical problem, but considered instead as the result of a given social context. In the same vein, we can view interpretations in terms of optimization as a cultural bias on the part of Western Archaeologists, products of cultures and societies where economic efficiency is highly regarded and where high degrees of performativity are demanded on the part of individuals.

The focus on technological practice of this approach, coupled with the avoidance of all-encompassing generalizations on technological practices, allows for finer and more detailed results which take into account the variation in technological practice that would otherwise be ignored. For instance, by considering that operational sequences to be to some extent unique and treating them as such during the analysis of the remains of these sequences (production debris, rejected objects, expended objects), statements on particular sequences can be proposed, as observations are attached directly to particular production events or activities. The greater scale provided allows for assessments of know-hows within the perspective of skill differentials or differential choices, which can then be examined in the totalizing contexts of social and economic relations within the given society. Although generalized models of technological practices (e.g. the reduction sequence as developed by Holmes (Shott 2003)) can easily provide higher level inferences, such models blur out nuances that can otherwise provide more insightful answers in regards to the relations between the technological practices of given groups and other systems within their culture.

1.1.1 Common concepts

The project, or *Schème Conceptuel* [Conceptual scheme], is the mental representation of a task to be carried out and the formulation of all the necessary objects to complete the desired task (Roche and Texier 1991). It is in the project that the forms of objects and their function are conceptualized. The *Schème Opératoire* [Operational scheme] is the planned sequence by the individual and the application of the individuals knowledge, know-how, and skill to the necessities of the project undertaken (Roche and Texier 1991). Knowledge is the sum of techniques, methods, and concepts known to the individual. Knowledge can be transferred between individuals through observation and through active teaching (Schiffer and Skibo 1987). Know-how is the application of techniques, methods, and concepts in the material realm, and is non transferrable, as know-how reflects the individual's skill and proficiency in application (Pelegrin 1990).

The *Chaîne Opératoire* (from here on referred to as operational sequence) concept is an analytical tool to organize the observations of the researcher in regards to a technical project. It is the visible and partial result of an operational scheme, which cannot generally be completely reconstructed from the archaeological or ethnographical data (Lemonnier 1986), as not all information pertaining to the knowledge, know-how, intents, and the project is maintained following the expiration of the individual(s) responsible for the assemblage or is fully interpretable to the outside observer (Soressi and Geneste 2011). The operational sequence concept, though sometimes equated to the reduction sequence (Shott 2003) due to the fact that both concepts aim to produce sequence models (Bleed 2001), does not limit itself to lithic artifacts, or even to archaeological materials in general, being a concept applicable to essentially any technique (Lemonnier 1983), including complex processes such as modern medical research (Bibard 1994). Contrary to the purely archaeological origin of the Reduction Sequence concept (Shott 2003), the Operational Sequence concept has mixed origins, stemming from archaeology and ethnology. Due to this mixed origin, the conceptual tools used in operational sequence style analyses need to be applicable in any technological context. The organization of sequence models also differs between operational and reduction sequences, whereas traditionally reduction sequence sequence models were organized around the degree of completion of given objects (Bleed 2001; Shott 2003). If well applied, operational sequence sequence models are organized around the applications of different techniques on a medium and the possible choices at different moments in the sequence (Coudart 1994; Cresswell 1994; Lemonnier 1994; Van der Leeuw 1994). Approaches similar to the French Technological school have however been gaining ground, and have begun focusing on the technological organization of past societies all while taking into consideration some technological criteria in their analyses, with some conceptual overlap (Carr and Bradbury 2011). Both approaches are also distinguished by their approaches to questions of theory. Whereas reduction sequence analyses tend to function through deductive logic, operational sequence analyses tend to be inductive. This difference leads to theory being generally implicit in operational sequence analyses, at least as practiced, with resulting difficulties in relating low- and mid-level theory to high-level theory (Tostevin 2011).

The technological non-specificity of the operational sequence concept is present among other commonly used concepts in the Anthropology of techniques, such as *façonnage* (from here on referred to as shaping), the act of gradually shaping a volume of material into a desired shape and volume, and *débitage*, the act of producing blanks from a prepared or unprepared volume of material (Boëda, et al. 1990). The former may as easily discuss the shaping of clay into the form of a vase as it may describe the shaping of a stone biface, and the latter can as well describe the splitting of wood as it can describe the preparation and use of a Levallois core. In the same vein, the operational sequence concept does not limit itself to "overly formalized" and non-contextual technical descriptions of objects (Bar-Yosef and Van Peer 2009), as this analytical tool's purpose is to order and comprehend discrete technical choices to be placed within their social context (Lemonnier 1993).

1.2 Interactions and exchange

As a social process, exchange can serve multiple purposes, such as a means of forging alliances, as a risk reduction strategy, and as a means of creating prestige among others (Dalton 1977; Sahlins 1972). The act in itself can create a cycle of reciprocity when an ethic of sharing is present, .attributable to a "spirit of the gift", or in less esoteric terms, the creation of an obligation to reciprocate (Mauss 2002). Exchange in non-complex societies can take multiple forms, mainly in the form of reciprocities. The classic example of reciprocal systems is that of generalized reciprocity, wherein goods are given with no expectation of returns in the foreseeable future. This form of reciprocity is generally present within kin groups and among individuals with little social distance (Sahlins 1972: 198). The second relevant form is balanced or accountable reciprocity. In this form, both partners exchange and expect to receive returns within a definite time period. The classic example of returns is of goods of equal or of greater value/amount, in some cases as direct reciprocity. To the contrary of generalized reciprocity, returns are expected from the receiver, with the relationship potentially being terminated should the receiver not reciprocate (the threshold does evidently depend on social distance and customs). Balanced reciprocity is generally present in a larger social sphere, being both applicable in-group and with individuals of other groups or of greater social distance. Balanced reciprocity may be delayed, more so should the partnership be within a more complex network (Healey 1984). In-group exchange may also take the form of demand sharing, also known as legitimate theft. Contrary to reciprocal systems of exchange, demand sharing is initiated by the receiver without expecting to reciprocate. This form of exchange is essentially cheating within a reciprocal system, in that if there is an ethic of sharing, the giver cannot refuse to give to the taker (Peterson 1993). Avoidance strategies can be used to reduce the attractiveness of demand sharing, for example the hiding or concealing of food and objects, and the conservation of items in non-processed forms (raw materials, storable unprocessed foods) (Bliege Bird and Bird 1997). Though prestige and ritual objects are commonly exchanged, perishable goods such as food are the most frequently reported goods for both in-group and intergroup exchange, be it the sharing of meat among foragers, or the exchange of animal hides for agricultural produce (Wright 1974). Utilitarian objects such as projectiles can be frequently given between hunters, though anthropologists tend to place such practices as being a symbolic gesture in relation to the ownership and sharing of meat (Peterson 1993).

Exchange, when inferred in archaeological contexts, is generally identified through the concentration of object types over distance. The greatest concentration of the observed objects will be in what is considered to be the supply zone, where the raw materials are available and where the objects are likely produced (Renfrew 1977). Outside of the supply zone, object concentrations rapidly decrease over distance in a unimodal manner. Such a decrease is either described as being the result of an absence of trade or of down-the-line exchange (Renfrew 1977). Spikes of concentrations or increases in concentration at distances may be interpreted as being the result of directional or market trade (Renfrew 1977). Evidently, the ideal for identifying exchange in the archaeological record is the presence of "markets" or of aggregation sites (e.g. Janetski 2002).

1.3 Task segmentation

The segmentation of operational sequences may occur for multiple reasons and purposes; differences in status resulting in phases reserved to certain individuals (Stout 2002), experienced individuals allowing apprentices to complete an object (J. R. Ferguson 2008), and incomplete or near-complete objects obtained through exchange and completed by another individual (Cross 1990: 71-72). This concept can and should be adapted to non-organized or task-centric production sequences. To avoid implying a form of group-participant centered production mode in unorganized production contexts, I suggest using “Interindividual Segmentation” in its stead. This moniker allows to drop the assumption of organized production and avoids immediate inferences in regards to the identities and relations of individuals linked together by a given operational sequence or sequences (as it is probable that the project intended for the object may change when in another individual’s possession). Much like task segmentation in the production of ceramics, wherein multiple individuals presenting different know-hows can contribute to individual artifacts (Crown 2007), inter-individual segmentation is the contribution of different individuals at different moments of an operational sequence.

Due to the multiple steps are present in the life history of lithic artifacts, spatial segmentation of sequences is important, and can provide many opportunities for an object to be transformed by multiple individuals. The acquisition of raw materials, their transformation, use, and eventual rejection are some of these instances. All of these moments are the result of deliberate choices made by the users. The raw material used in a given sequence is chosen based on perceived properness of the materials for the project undertaken (Wenzel and Shelley 2001), the materials available in the environment (Andrefsky 1994), and the processing techniques known and utilized by the individuals. In regards to the functional differentiation of raw materials, some characteristics of materials may be favored (such as durability or abundance), though their use may require adapting sequences due to unfavorable properties also present in the materials (Margaris 2014). The “costs” of raw materials are generally considered by archaeologists. Distance from site to source is a classic factor of attraction, though alone it cannot explain raw material choice as we must consider that the movement of humans is not random and generally is organized to a certain degree (Binford 1979; Gould and Saggers 1985). The calories expended to attain the source, either through the estimation of calories or through the calculation of the slope to attain the source, allows for a better estimation of the effort required to reach a source (Wilson 2007a). Though the "cost" of extraction is occasionally considered, it is an irrelevant metric, as different extracted forms require different methods of processing, and may not necessarily be used for the same implements[i]. Indirect acquisition, through processes of exchange, allows the user to circumvent these costs (Ericson 1977).

Segmentation may occur at any moment after the extraction of blanks, dependent on technological practices, i.e. what forms circulate between extraction areas and other site forms (Brumbach and Weinstein 1999; Burke 2007b). More experienced individuals may also transfer the object to a less experience individual if the latter is deemed capable of continuing the sequence, allowing the latter individual to practice techniques all while successfully producing an object (J. R. Ferguson 2008). An object may also be purposely made for exchange, with sequences consistently paused at a moment, as is the case of Early Woodland Meadowood bifaces, which are transferred between groups and then into either utilitarian or ritual contexts (Granger 1981). In the former case, the biface is either proximally retouched to add notches for hafting or is retouched into an end scraper.

1.4 Culture History

1.4.1 Early Archaic

This cultural historical period spans roughly from 10 000 rcyBP to around 8 000 rcyBP (Forrest 1999). Though not uncommon in the Northeast, the few initially reported Early Archaic contexts in the Northeast have in the past been attributed to ecological factors, wherein the pine forest ecotone presented a low population carrying capacity (Ritchie 1979b). The initial low number of contexts may in fact be due not only to concentrating upon a small set of diagnostic artifacts, but also due to archaeological practice favoring methods that are better suited to the identification of contexts of more recent periods (Nicholas 1987). Groups of this period are generally considered to be relatively small and highly mobile (Pagoulatos 2003). Sites are generally small and artifactually poor, though some larger sites (Ellis, et al. 1991) have been observed. In general, diagnostic materials of this period in the Northeast have been found out of context (ex. Surface finds) or in mixed assemblages (Stothers 1996; Trubowitz 1979). Due to issues with preservation, little is known of Early Archaic subsistence patterns in the Northeast, though it has been considered previously that the Early Archaic marks a transition towards a more generalized subsistence economy (Tuck 1974). In social terms, Early Archaic foragers in the Northeast are non-complex and reside in relatively small groups, owing to the small number of Early Archaic sites in the Northeast and the relatively small size of known occupations, though some larger more intensively occupied sites are known (Ellis, et al. 1991).

Raw materials, mostly cherts and rhyolites are utilized by Early Archaic groups. Though in regions neighboring the Northeast materials circulate over large distances similar to those occurring during the Early Paleoindian (White 2014), raw material circulation during the Early Archaic in the Northeast is more in line with other later periods, with an overall focus upon local raw materials (e.g. Bursey 2012; Ellis, et al. 1991; J. P. Ferguson 1995) and moderate circulation distances for these raw materials (Bursey 2012). Diagnostic biface forms recognized in the Northeast are the same as those found in the Southeast, with both side and basal notching, some with corner notching, and some types present serrated edges (Brennan 1979). The Kirk Corner-Notched type is occasionally subdivided between narrow and large forms, with the former forms made upon more diminutive flake blanks and presenting covering removals (or even overshot removals according to the description) on the internal face of the blank with some shaping done from the proximal edge, whereas large forms are produced from larger, flatter, blanks with somewhat more random patterns of shaping (Bursey 2012). Lithic assemblages of this period are formed of a mix of bifacial and flake tools, both formal and expedient, including scrapers, awls, and unretouched flakes among other (Adovasio and Carr 2009; J. P. Ferguson 1995). In the northern part of the Northeast, ovate knives are also present in Early Archaic assemblages (F. W. Robinson and Crock 2006). The earliest evidence of polished or abraded stone technology appears during this period (Sources and examples). As of writing, normative Early Archaic assemblages with bifacial implements have yet to be identified in Quebec.

The Gulf of Maine Archaic Technological Tradition, which contrasts with the expected assemblages, overlaps both the Early and Middle Archaic in the Northeast, from around 9000 to 6000 rcyBP. This technological tradition was first identified in Maine, but is also present in New Hampshire, Vermont, and Quebec (Bunker 1992; Plourde 2006; B. S. Robinson 1992). The technological system of this tradition centers on the use of quartz unifaces which are potential cores, with the presence of macrotools such as gouges, rods, and ovate knives (B. S. Robinson 1992). Potential use of composite tools, though little evidence is available at present to demonstrate. It is likely that tools made of organic materials, such as bone and antler, may have been used *en masse* but not conserved due to poor preservation conditions in the Northeast. As quartz is the main material used, raw material circulation is difficult to determine, as quartz is essentially available everywhere. As the assemblages are not very distinctive, they can easily remain unobserved and undistinguishable in mixed contexts. Outside of sites presenting a significant and defendable vertical differentiation, identifying an assemblage as GMAT is tenuous at best. Bifacial implements are rare, if not completely absent, from GMAT assemblages.

Known Early Archaic burials in the Northeast are primarily of the Gulf of Maine Archaic Tradition. In the known instances of Early Archaic burials in Maine, burials are formalized and are uniquely present in mounds (B. S. Robinson 2006: 346). Human remains are found to have been cremated, and are accompanied by an array of polished stone tools and objects (gouges and stone rods primarily), occasional bone implements, and red ochre. Bone implements include both utilitarian objects (scrapers, beaver mandibles), non-utilitarian (potential turtle shell rattles), and unmodified bone). Objects found in these burials do not show evidence of heat damage, and are therefore unlikely to have been cremated with the body (B. S. Robinson 2006).

1.4.2 Middle Archaic

The Middle Archaic in the Northeast was defined from the assemblages at the Neville site, by similarities with the Middle Archaic assemblages of the Middle Atlantic and the Southeast (Dincauze 1971). This period is generally referred to as dating from 8 000 to 6 000 rcyBP. Similar to the Early Archaic period, sites are not numerous though they are not uncommon in the Northeast. Bifaces of this period are however more common than that of the preceding period, although GMAT assemblages continue occurring. Populations remain quite mobile during this period in the Northeast, exploiting a broad range of habitats including adaptations to the coastal areas of New England, and lithic raw materials are presumed to be exchanged as non-terminated forms by these populations (Rainey 2005). Social organization remains non-complex, though insist that there may be the development of a small-scale craft specialization during this period (Rainey 2005).

Few bifacial types are recognized in the Northeast for the Middle Archaic period; Only the Stanly/Neville, Morrow Mountain/Stark, and Merrimack types. Both former types do not distinguish themselves from a functional perspective, as both types are used for multiple tasks including cutting and perforating (Ives 2014)[1]. Differentiation in raw material choice has been noted between Neville and Stark types, with the former type being generally made of finer materials and the latter type being made of more difficult or of lesser quality materials (Cross 1999). Bifaces of these types may also be made of raw materials acquired from secondary sources (Bergman, et al. 1998).

Among other materials considered as diagnostic are fully channeled gouges. These gouges are often found in burial contexts, though they are also present in more mundane contexts. Stone rods are also a common grave good in Maine, occurring in Early Archaic to Late

[1] The Ives (2014) study should not be taken as face value, as neither high-powered microscopy nor an experimental reference database were utilised for the interpretation of damage types.

Archaic burials (B. S. Robinson 2006), though these objects do however also occur in habitation contexts and are present in assemblages as far as the Great Lakes (Bursey 2014). Polished stone rods are not however unique to the Middle Archaic, as they also do occur in early Late Archaic assemblages (Ritchie 1979a). Apart from the stated ritual function, these objects may have also served as an abrader to create and maintain the channels of fully channeled gouges (Sanger, et al. 2001). These rods are generally made of foliated low-grade metamorphic rock, produced through the alternate unifacial pecking of a tabular blank with a ridged hammerstone (a chopper in Adams (2002)'s terminology), followed by abrasion to even the form, and completed by polishing with sand and water (Sanger, et al. 2001).

Middle Archaic burials in northern New England (New Hampshire, Maine, Massachusetts) tend to remain in line with the few known Early Archaic burials: burials present a range of polished or ground stone tools, including fully channeled gouges, adzes, celts and polished stone rods, occasionally include chipped stone implements such as bifaces, and generally include the use of red ochre (B. S. Robinson 1996). Human remains also tend to be cremated in these contexts (B. S. Robinson 1996).

1.4.3 Late Archaic

The Late Archaic, dating from around 6 000 to 4 500 rcyBP in the Northeast, is the theater of increased regionalization in material culture. The "Laurentian tradition" in a strict sense, refers to a Late Archaic ensemble of lithic artifacts, mostly macrotools, co-occurring occasionally with copper artifacts, present in and around the St. Lawrence River valley. Macrotools considered to be characteristic of this archaeological tradition are semi-lunar knives, gouges, beveled adzes, and bayonets (Funk 1988). On occasion the passive sections of macrotools are pecked after their final shape and volume are attained, and after thorough abrasion or polishing (Clermont and Chapdelaine 1998a: 90). Though "Laurentian-like" is to be used when these assemblages occur outside of the defined region (Funk 1988), as there are generally no concurrent material traditions in given regions during the Late Archaic, only the period will be used hereon to avoid undue taxonomism. Subsistence of Late Archaic groups is rather generalized, with the exploitation of aquatic, terrestrial, and plant resources. The first evidences of the domestication of plant resources appear during the Late Archaic, generally in the form of wild management of some plant species, including chenopodium (Smith 2011). In some instances, aquatic resource acquisition may be intensified, as evidenced by the identification of fish weirs dating to the Late Archaic (Petersen, et al. 1994), and of sites wherein fish acquisition was oriented towards seasonal abundance, such as the Ile-aux-Allumettes site (Cossette 2003). Such evidences can be indicative of a form incipient complexification, as both resource acquisition strategies require the consolidation of potential labor and significant maintenance.

Cemetery sites and components also begin occurring during the Late Archaic. In these contexts, dozens of single burials are recorded, generally containing grave goods. The types of grave goods present, are generally utilitarian and may comprise an individual's toolkit, and may also include musical instruments and ornaments, without however varying greatly in accordance to gender (Ritchie 1980: 120-124). On occasion prestige items, such as copper (Clermont and Chapdelaine 1998b, 2003), and display items such as plummets, may occur in burials. The presence of cemeteries themselves may represent a change in the relation with the environment, in that through repeated burials at a same area the ownership of the surrounding land is continually reasserted.

Native copper objects are uncommon in Late Archaic assemblages, as known and utilized sources of native copper during the Late Archaic are generally in the western Great Lakes region (Levine 2007), and it is mainly Old Copper culture objects that circulate (Ehrhardt 2009). However, localized forms are present when transformative techniques are known by recipient groups, such as in the case of the Île-aux-Allumettes and Île-Morrison sites, though typical Old Copper forms are also reproduced *en masse* (Chapdelaine and Clermont 2006).

Lithic raw material acquisition during the Late Archaic is primarily focused upon locally available raw materials (<40km radius), with sites generally presenting a majority of locally available materials and a minority of extra-regional materials. In contexts such as the Ile-aux-Allumettes site, likely an aggregative context, lithic production is nearly entirely conducted with locally available materials (quartz in this instance), though the strong majority of rejected tools are extra regional, coming from distances of 100 kilometers to nearly 300 kilometers in distance

(Burke 2003). Given the greater complexity and more intensive use of local materials, it is likely that extra-regional materials are generally obtained though exchange during the Late Archaic, though this does not prevent individuals from obtaining materials directly by their own agency (see Gould and Saggers (1985) for a discussion on direct acquisition over long distances).

1.4.4 Terminal Archaic

The Terminal Archaic, or sometimes "Post-Laurentian Archaic" in Quebec archaeological literature, designates the period dating from around 4 500 rcyBP to 3 000 rcyBP. Multiple start and end dates are given for this period, generally depending on the region and the author. Some temporal overlap is present between the end of the Late Archaic and the beginning of the Terminal Archaic. There is significant temporal overlap for both technological traditions of the Terminal Archaic. Starting at around 3 900 rcyBP Broadpoint Tradition assemblages appear in the Northeast, without a cessation of Narrow Stemmed Point Tradition assemblages. Both traditions are considered to end at around 3 200 rcyBP, though the Orient phase is occasionally considered to be part of the Broadpoint Tradition. Apart from the diagnostic bifaces for which the two traditions are named, both present assemblages of macrotools including axes, adzes, fully grooved celts (BPT), pestles, atlatl weights, pitted stones, and semi-lunar knives (NSPT) (Dincauze 1972; Funk 1976: 247-254; Turnbaugh 1975). In both cases subsistence and settlement are generalized and in continuity with the Late Archaic, with use of terrestrial, aquatic, and plant resources, and an exploitation of a wide variety of habitats (Pagoulatos 2010). Such similarities are also retained in terms of food processing, with the evidence of enlarged hearths present in Terminal Archaic aggregation sites (Dowd 1998).

Both technological traditions present themselves with different ritual practices. Whereas NSPT burials practices tends to be in line with Late Archaic practices, the Broadpoint tradition presents rather original burials in comparison. Whereas NSPT and Late Archaic burial contain flexed or extended bodies, bodies are fully cremated in BPT burials (Dincauze 1968). Bifaces are systematically found in BPT contexts, and are ritually killed and included with the cremation, or are included with the body during cremation (Leveillee 1999). BPT burials also present slightly more varied burial goods when compared with Late Archaic and NSPT burials (Pagoulatos 2009), though burials of all traditions tend to contain chipped stone implement, ground stone implements, and bone implements.

Narrow Stemmed Point Tradition (NSPT) bifaces are made of any material capable of fracturing in a conchoidal fashion, including the full range of cherts, volcanics, sedimentary, and metamorphic rocks (Bélanger 2012; Corbeil 2007; Dowd 1998; Strauss 1989). Evidently, regional geology maintains its part in the process of raw material selection. Narrow stemmed point diagnostic bifaces-tend to be relatively narrow, thick, and elongated[2] (Ritchie 1961: 14, 29, 37, 44, 126). Occasionally among NSPT bifaces, notably Bare Island type bifaces, the striking platform of the flake blank is partially maintained as the base of the stem (Strauss 1989). In this case all removals, apart from those necessary to produce a convergence at the distal extremity, are initiated perpendicular to the morphological proximal-distal axis of the flake blank. Some retouch may be present at the base to narrow or thin the stem parallel to the morphological axis. Such a technique likely allows the production of a relatively thin and narrow biface without much training, but seems likely to produce bifaces of lesser size. Normanskill type bifaces differentiate themselves on this point, as they tend to neither present cortex nor striking platform elements, but present well defined notches, with active sections which are more likely to be broad, and with better defined shoulders (Ritchie 1961: 37). In a sense this type may be viewed as less expedient, as no blank characteristics may be retained throughout the sequence. Dowd (1998) elaborates a sequence model for this type, though the model itself is essentially a rehashing of the sequence model proposed by Callahan (1979) for bifacial technologies in general. The first stage, the acquisition of blanks, is reported to be done through the *débitage* of blanks from amorphous or tabular cores. This stage would be followed by an initial shaping of the blank to create a relatively ovoid biface, without much loss of thickness.

[2] Three other biface types of the NSPT, the Sylvan lake, Vestal, and Squibnocket types, do not fit this description. These types are however more typical of western New York during the overlap with the Late Archaic, and the author has yet to observe these types utilized in the Quebec literature.

At a third moment, the thickness of piece is gradually reduced likely through soft hammer percussion (Dowd 1998: 130). At the fourth moment, the biface presents a thickness close to that which is desired and now presents a relatively triangular form, implying the creation of a proximal edge and some shaping from this area. The fifth moment is the completed Normanskill-like biface, presenting notches (Dowd 1998: 132).

The Broadpoint Tradition, contemporaneous to the Narrow Stemmed Point Tradition in the Northeast, with the earliest assemblages dated to around 3 900 rcyBP, and ending either at 3 200 rcyBP or 2 800 rcyBP, depending on the position taken by the archaeologist in regards to the placement of the Orient phase in either the Terminal Archaic or the Early Woodland periods. For the purpose of this thesis, the Orient phase is considered to be part of the Terminal Archaic. Part of this ambiguity is due to the presence of Orient bifaces in contexts with steatites vessels, and the persistence of Orient bifaces in Early Woodland contexts presenting ceramic vessels (Ritchie 1980: 173; Snow 1980: 242). There is a plausible disconnect between the lithic bifacial technical subsystem and the subsystems related to stone or ceramic vessels during this phase, which evidently demonstrates the weaknesses of defining archaeological cultures by the absence of techniques (Starna 1979) and the problem of using bifacial technologies to define archaeological cultures (Otte 2003). This tradition is considered to be an exogenous cultural entity, as the earliest dated assemblages are present in Virginia, at around 4 500 rcyBP, and present Savannah River type bifaces (a type absent from the Northeast, and similar to the Coens-Krispin type bifaces of the Middle Atlantic) (Pagoulatos 2010). Demic diffusion was long proposed to be the primary proposed mode of diffusion of the Broadpoint Tradition into the Northeast (Sanger 1975; Turnbaugh 1975).

Broadpoint Tradition bifaces are made of any and all materials, including cherts, volcanics, metamorphics and quartz. Raw material patterns seem to be in continuity with preceding periods. The production of large ovate (and shouldered) or triangular bifaces is conducted at quarry sites (Cresson 1990). Bifaces are either further shaped into pentagonal preforms at the quarry or further shaping is continued elsewhere. This may not always be the case, as terminal/completed bifaces made of quarried materials are also on occasion found on quarry sites (Funk, et al. 1989; Strauss and Hermes 1996). The distinct pentagonal shape is either obtained gradually throughout the process (Cresson 1990) or is obtained by removing the corners of a triangular biface at the end of the shaping process (Ellis, et al. 1990: 100). It is also proposed that there is an intentional production of large flakes to serve as flake blanks for smaller bifaces (Cresson 1990). It must however be noted that larger removals tend to allow the knapper to more easily produce broad and thin bifaces. Prior to the completion of the biface, a distinct stage in the operational sequence is present: A preform stage, typologically referred to as Mansion Inn bifaces. These low-shouldered pentagonal bifaces are believed to be objects of exchange, and occur as killed grave goods and in caches (Dincauze 1968, 1972; Funk, et al. 1988; Leveillee 1999). The bifaces remain utilitarian when needed. Similar bifaces, named Boat bifaces, are more of a teardrop or leaf shape, and occur occasionally in Terminal Archaic contexts (Dincauze 1968). Completed biface forms, such as the Genesee, Snook Kill, Perkiomen, and Susquehanna Broad types, tend to have long use lives, as evidenced by non-uncommon recycling of the biface types into other objects, such as end scrapers (Kraft 1990) and into bifacial drills through controlled resharpening (Cresson 1990). Double beveled resharpening of the active section of the bifaces is reportedly common (Cresson 1990), and can result in a significantly longer use life (Sollberger 1971). Though the function of these bifaces has long been debated (Cook 1976; Custer 1991; Dunn 1984; Truncer 1988), it is safest to assume a full range of functions, including both cutting, projectile, and prying, than to simply imply that these bifaces are simply cutting implements (Truncer 1990)[3].

[3] The same caveats as the Ives (2014) study apply to the Truncer (1990) study.

2. Archaeological context

2.1 Site placement

The Gaudreau site is situated on the west bank of the St. François River at the confluence with the Saumon River, near the present day municipality of Weedon, Quebec (Figure 2.1.1). The St. François River flows north to south, whereas the Saumon River discharges into the St. François River. Taken towards the north, the St. François River leads to Aylmer Lake, and eventually to St. François Lake. If taken towards the south, in direction of present-day Sherbrooke, the St. François River leads eventually to the St. Lawrence River. As for the Saumon River, a 50 kilometer counter-current trip leads to Mount Mégantic. During the 19th century a small town, Trahan's Mill, was present in the vicinity of the site (Graillon 2013: 52). This town was centered on the operation of a water mill held by the Trahan brothers. The Trahan mill burnt in 1889, followed by a gradual depopulation of the town of Trahan's Mill.

The Gaudreau site is spread onto two terraces on a south to north axis; an upper terrace at 247 meters ASL and a lower terrace at 245 meters ASL (Graillon 2013: 15). Both terraces are relatively level, but do however slope slightly towards the river. The lower terrace is occasionally flooded during the spring, summer, and fall overflows of the St. François River (Graillon 2012: 20). On the opposite banks of the confluence are the sites BkEu-3 and BkEu-4. Both of these sites are fairly uninvestigated, with only surface collection and test-pitting having been undertaken in 1963 and 1981 (Lévesque 1962; Morin 1981).

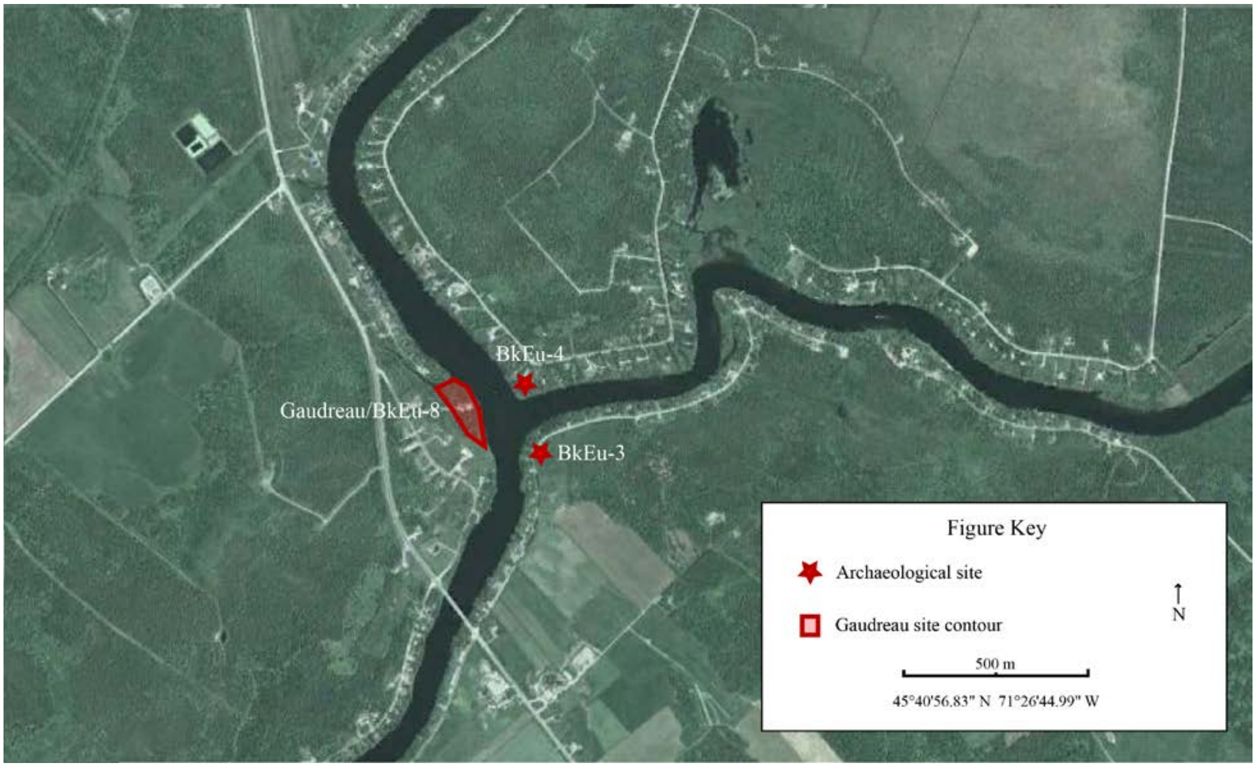

Figure 2.1.1: Location of the Gaudreau site. Figure based upon data from Google Earth.

2.2 Regional Context

2.2.1 Geological context

The bedrock upon which the Gaudreau site is located belongs to the Lac Aylmer formation (Figure 2.2.1 and Table 2.2.1). The bedrock in this area is mainly composed of limestones. This would likely limit raw materials available in the immediate vicinity of the site, but the presence of the Saumon and St. François rivers present a certain reservoir of adequate materials. Graillon (2010) notes the presence of quartz and mudstone cobbles along the river bed. Quartz being a plutonic mineral, its presence is unsurprising. As for the silicified red mudstone, it is likely derived from the Beauceville formation found upstream on the St. François River (Burke 2007a). Other materials available in a 15km radius of the site include shales, granites, sandstones, and chert (Table 2.2.1). These materials may have been used, but at this time it is unknown if they are proper for use.

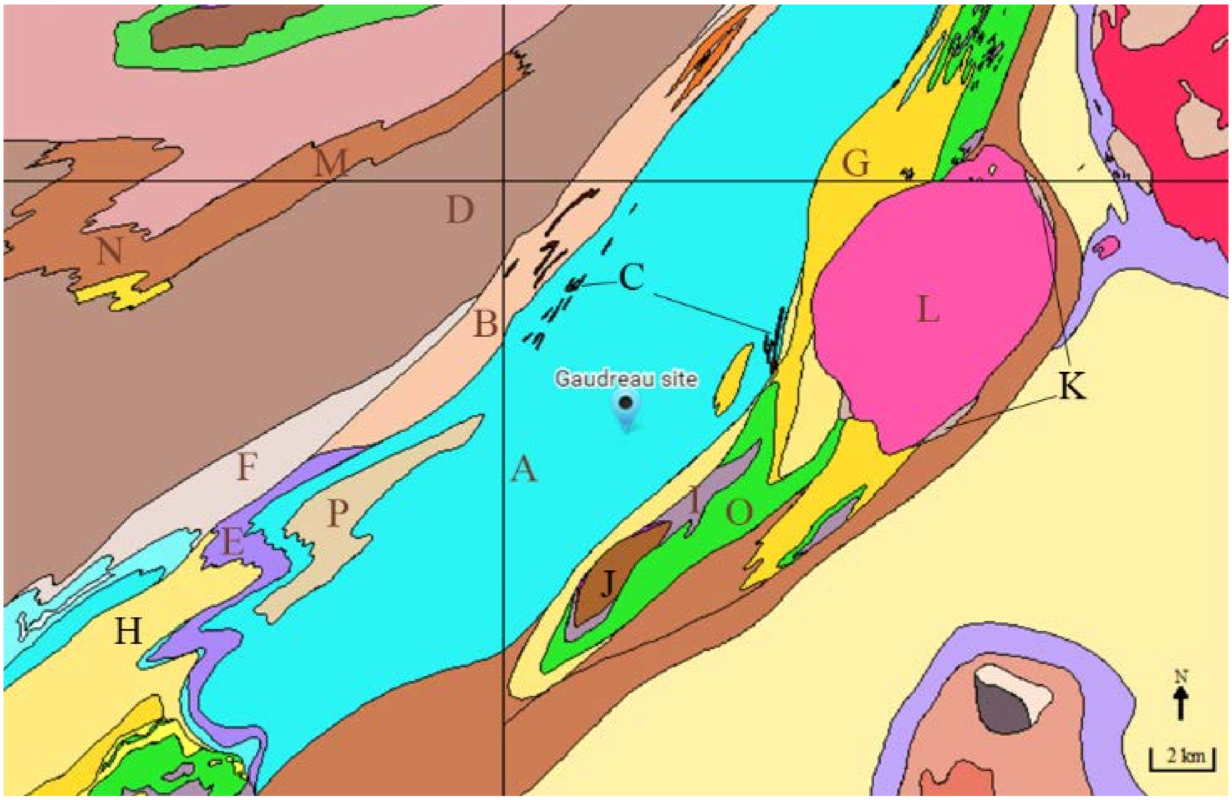

Figure 2.2.1: Placement of the Gaudreau site in relation to the local geological formations. The site is located in the area of the Lac Aylmer 4 formation (light blue). Other relevant formations are described in Table 2.2.1. Figure obtained from the SIGÉOM online database (MÉRNQ 2015).

Various lithic raw materials are available within the greater region of the Eastern Townships. The most ubiquitous of these is a silicified red mudstone with primary deposits in the area of the St. François Lake, and which is also present in secondary contexts such as glacial deposits and as river cobbles throughout the Eastern Townships (Burke 2007a; Codère 1996: 56). It is there quite simple to access this source from the Gaudreau site, as the St. François River flows from this lake, with the trip being around 30km to the proposed source area. This material is generally fine grained and matte in appearance, though more vitreous variants do occur, and usually presents a red color (Codère 1996: 56). No minerals are generally visible macroscopically at the surface, though interbedded quartz veins are occasionally present. The Eastern Townships also presents multiple sources of rhyolites, which are likely utilized. The Montagne de Marbre rhyolite outcrops at around 50km to the southeast of the Gaudreau site, around 20km to the south of Mégantic Lake. Though the rhyolite is utilized in proximity to its source, no direct evidence of quarrying was identified at the two examined outcrops of the source (Graillon and Costopoulos 1997: 61). This rhyolite presents a moderate to fine texture, is semi-translucent, is occasionally banded, and may present cleavage planes (Burke 2007a). As for color, this material is generally dark grey or black, but is easily weathered and can present a more beige or pink color (Burke 2007a; Burke, et al. 2014). This material can also present itself as a green porphyric rhyolite, previously named "Notre-Dame-des-Bois rhyolite, which is macroscopically identical to the Kineo-Traveller group of rhyolites (hereon referred to as simply Kineo-Traveller rhyolite), displaying both the quartz and feldspar phenocrysts, similar textures, and the distinct green color (Codère 1996: 49). From a geochemical standpoint this material is distinct from the Kineo-Traveller rhyolite, though the small sample size may represent part of this distinction (Burke, et al. 2014). The Ascot formation rhyolite is present in primary context in the general vicinity of the Gaudreau site, though no outcrops nor quarries are reported by Codère (1996: 48). This material characterizes itself by a banded though shale-like appearance, a fine texture, is translucent, presents quartz phenocrysts, and is of generally a dark grey color (Codère 1996: 48).

#	Formation	Age	Lithology	Hypothetical uses	Distance from site
A	Lac Aylmer 4	Silurian to Devonian	Silty limestone, massive limestone	n/a	Immediate
B	Lac Aylmer 1a	Silurian to Devonian	Polygenic comglomerate, lithic sandstone, siltstone, argilite	Abraders (Sandstones)	<10km
C	Lac Aylmer 6	Silurian to Devonian	Gabbro	n/a	<10km
D	Saint-Victor 1	Middle to Upper Ordovician	Mudrocks with interbedded sandstones/siltstones, mudrock rythmites, siltstone, and sandstone	Abraders (sandstones), Blanks for macrotools (Mudrocks)	<10km
E	Lac Aylmer 2	Silurian to Devonian	Massive dolostone, dolomitic sandstone, conglomerate	n/a	<10km
F	Saint-Victor 5	Middle to Upper Ordovician	Grey (dolomitic) sandstone interbedded with dark shale	Blanks for macrotools (Shale)	<10km
G	Ascot 3	Middle to Upper Ordovician	Laminated rhyolitic tuf, sericite schist	Blanks for chipped stone (Rhyolitic tuf)	<10km
H	Beauceville 1	Middle to Upper Ordovician	Feldspathic sandstone, brown claystone	n/a	<10km
I	Ascot 4	Middle to Upper Ordovician	Granite, tonalite	Hammerstones (Granite)	<10km
J	Ascot 6	Middle to Upper Ordovician	Gabbro, hornblende gabbro, quartz gabbro	n/a	<10km
K	Aylmer 2 pluton	Middle Devonian	Gabbro	n/a	<10km
L	Aymer 1 pluton	Middle Devonian	Granite, biotitic granodiorite, granitic dykes	Hammerstones?	<10km
M	Beauceville 3	Middle to Upper Ordovician	Sandstone, shale, tuf	Abraders (Sandstone), Blanks for macrotools (Shale)	10-15km
N	Beauceville 3	Middle to Upper Ordovician	Siltstone, fine tuffaceous green sandstone, green sandstone, green chert	Blanks for chipped stone (Chert)	10-15km
O	Ascot 1	Middle to Upper Ordovician	Basalt, pillowed basalt, chlorite-albite schist, jaspilite	Blanks for macrotools (basalts)	<10km
P	Aylmer 5	Silurian to Devonian	Dolomitic and limey siltstone, interbedded laminated limey dolostone	n/a	<10km

Table 2.2.1: Main formations in the vicinity of the Gaudreau site. Hypothetical uses are based upon the rock types present in the formation, but are mere assumptions as it is unknown if the materials found in these formations are in fact proper for the uses here proposed. Data obtained from the SIGÉOM online database (MÉRNQ 2015).

2.1.2 Regional archaeological context

Occupations in the Eastern Townships span roughly 12 000 years, as this region is the home to the only Early Paleoindian site in the province of Quebec, the Cliche-Rancourt site (Chapdelaine 2007, 2012). Occupation of the region would therefore have commenced nearly as soon as continental glaciers no longer occupied the territory (Chapdelaine 2007, 2012; Richard 2007). Other early occupations include a Late Paleoindian component at Cliche-Rancourt, a Late Paleoindian component at the Gaudreau site, and a yet unpublished Late Paleoindian occupation in Bromptonville (Chapdelaine 2007; Graillon 2014; Graillon, et al. 2012). As of the present day, no Early Archaic sites are reported within the region. A site in the downstream municipality of East Angus was considered a potential Early Archaic occupation by Graillon (1999) due to the similarities of the lithic assemblage with the GMAT, but recent excavations by the *Musée de la Nature et des Sciences de Sherbrooke* and the *Université de Montréal* have however placed the site during the Middle Archaic, due to a radiocarbon date of 7 630±45 calBP (Graillon and Chapdelaine 2015: 78). Other Middle Archaic occupations are known in the region, notably a small component bearing a Neville-like biface at the Gros Bouleau site, near Mégantic Lake (Corbeil 2007). Late Archaic and Terminal Archaic occupations are also present in the region, generally in the form of relatively small sites on well drained terraces along rivers and lakes (Corbeil 2007, Graillon 2011). Late Archaic materials have also been found out of context on occasion in similar locales (Graillon 1994: 27). All sub-periods of the Woodland period are present in the region, and follow the same tendency to be adjacent to rivers or lakes (Arkéos 1999; Chapdelaine and Beaulieu 2007; Provençal 2011; Vidal 2007). Part of this consistency may be due to archaeological practice. However, even when efforts are made to examine inland areas, negative results ensue (Graillon 2008: 13).

Sites in the Eastern Townships generally present lithic assemblages composed mainly of quartz or red silicified mudstone, in either order of importance (Corbeil 2007; Graillon 2013; Vidal 2007). The following major material are rhyolites, in most cases Kineo-Traveller like rhyolites are noted in the published literature. Mégantic Lake sites, such as Gros-Bouleau, Nepress, Nebessis, and Du Chalet, generally present greater amounts of rhyolites, both in terms of flakes and in terms of tools and objects rejected during production (Chapdelaine and Beaulieu 2007; Corbeil 2007; Provençal 2011; Vidal 2007). Cherts generally represent lesser than 10% of lithic assemblages in the region in terms of flakes. Due to their easy recognition, Onondaga chert, Munsungun chert, and other Appalachian cherts are reported within the region (Letendre 2007). As the sites are mostly palimpsests, it is difficult to ascertain which occupations contributed different raw materials outside of the identification of diagnostic objects.

2.3 Site excavation

The Gaudreau site was initially discovered by the *Société d'Archéologie de Sherbrooke* [Sherbrooke archaeological society] during the summer of 1967, while surveying the region between St-Gérard and Lenoxville, Qc. The field methodology of the 1967 report is unclear as to whether screening was done, as to what were the dimensions of test pits, and which tools were used to excavate the test pits. The only detail available on the field methodology is that test pits were excavated to a depth of five feet. A total of 48 artifacts were found during the excavation, mainly quartz (25) and red silicified mudstone (11) flakes, along with 9 scrapers and 3 tool fragments. Though reported, the site was not formally registered by the Ministry of Culture. Such a mistake is likely due to simple clerical error and the absence of follow up excavations.

During the summer of 2007 Graillon and his team were tasked by the engineering firm Teknika-HBA to survey the impact area of future canalizations to be installed by the municipality of Weedon (Graillon 2008: 1). Though outside of the impacted area, the project's proximity to the potential location of the unregistered site motivated efforts to pinpoint the site in an area fitting the description of its whereabouts. Although no test pitting was undertaken by the team, surface collection allowed for the recovery of 422 flakes and 49 stone tools and tool fragments (Graillon 2008: 22). The investigation was limited to the eroding bank at the northernmost end of the site, though some artifacts are reported to have been found on the surface of the lower terrace.

During the summers of 2010, of 2011 and of 2012, the Gaudreau site hosted the field school for youths held by the MNSS. The 2010 field season was a mix of survey and of standard excavation, affecting both terraces (Graillon 2011: 12). Test pitting was done by trowel, and included screening with a quarter-inch hardware mesh. As for the standard excavation, it was done by trowel and soil were screened with a quarter-inch mesh superposed above an eighth-inch mesh (Graillon 2011: 13). The same methods were used during the 2011 and 2012 field season. However, a 3/8-inch mesh superposed above a quarter inch mesh was utilized during the 2012 field season for areas where the soils were overly hydrated, if not swampy (Graillon 2013: 23). These areas were excavated due to the intention of the landowner to install a landfill and even-out part of the site, to be able to use part of the plot as a parking area for recreational vehicles.

2.4 Spatial Organization

2.4.1 Site areas

Upper terrace

The upper terrace of the site is subdivided into four sectors, though there is a certain continuity between the subdivisions. The fours sectors are as follows: The Mill sector, which is the furthest to the south, the South Sector, the Central sector, the North Sector, and the West sector.

The "Mill sector" (*Secteur du moulin Trahan*) refers to an area previously occupied by the Trahan mill prior to its destruction by a fire in 1889 (Graillon 2013: 15). No prehistoric cultural materials are as of yet recognized in this locus, as few test pits were conducted in this area of the site (Graillon 2011: 34, 2013: 7, fig. 3). The soil in this area presents the remnants of the mill and wreckage of its foundation (Graillon 2011: 32). It is likely that the construction and subsequent destruction of the mill disturbed or destroyed whatever occupations that may have been subjacent.

The South sector is subdivided into two zones that overlap: The Contact zone and the Ancient zone. The former of these zones, the Contact zone (*aire du contact*), located between lines 62N and 74N, and refers to the primary area of the site. This area has yielded the most artifacts and the highest densities of artifacts (more than 3000 in some units). The present day (as of Graillon 2013) surface of this area is utilized as pastures for the landowner's horses. This area is poorly drained, making the soils mobile and easily susceptible to mechanical disturbances. Graillon (2012) reports that the repeated trampling of the area by the horses has on occasion brought artifacts to the surface of the soil. The Ancient zone (*aire ancienne*), beginning north of line 74N, obtained its name due to the presence of a Late Paleoindian component present within of the zone. This area of the site is essentially an extension of the Contact zone, as there is a continuity in the distribution of artifacts (Graillon 2013: 78, fig.16). This area is among the more wooded areas of the site. This is also one of the rare areas of the site to present cultural materials in the B layer of its soils.

The Central sector of the site is also known as the Plantation zone (*Secteur de la plantation*), and comprises a relatively restricted area (between lines 85N and 100N) within which are present exogenous Norway spruce (*Picea abies*), planted roughly 60 years prior by the landowner's father (Graillon 2013: 54). The area is quite swampy according to the Graillon reports, and is the area within which the 3/8-inch over quarter-inch screens were primarily utilized. This area presents both Middle Woodland, Late Archaic, and Terminal Archaic cultural materials, though it lacks ceramics. Graillon (2013: 110) proposes that the combustion feature located in this area is likely to be associated to the Archaic remains in part due to this absence. However, the lack of radiocarbon dating and direct associations between diagnostic materials and the feature disallows attribution of the feature to either or any time period.

The North and West sectors of the site are rather limited in size, as only an area of three meters square was excavated during the 2012 field season for the former and fifteen meters square for the latter (Graillon 2013: 71). No temporally diagnostic artifacts were found in either zone. The West sector is much richer in cultural materials than the North sector, as it presents six tools and 1099 flakes, whereas the north sector only presents 37 flakes (Graillon 2013: 71, 73).

Lower Terrace

The Lower Terrace is a relatively small section of the site, representing an area of around 350 square meters delimitated to the north by a dried creek and to the east by the St. François river (Graillon 2013: 26). Norway spruce is also present on this terrace, which was used as pastures for livestock prior to the planting of said trees nearly 60 years ago (Graillon 2013: 26). This area of the site is periodically flooded by the St. François River, sometimes multiple times per year (Graillon 2013: 26). Only 25.5 square meters of this area of the site were excavated throughout the three field seasons, in part due to the high density of roots in the soils of this terrace (Graillon 2013: 27).

2.4.2 Stratigraphy

The site does not present a complex stratigraphy: Only two stratigraphic layers are present and are essentially identical on both terraces. The first of these is a brown to dark brown humic soil (Ap), which is more than likely heavily disturbed and may have been ploughed in the past (Graillon 2011: 17, 37, 40). This layer generally presents a thickness ranging from 20 centimeters to around 30 centimeters (Graillon 2011: 17, 40). The humidity of the soil is highly variable, ranging from being relatively dry to being completely humid, with the latter occurring in relatively large areas of the upper terrace (Graillon 2013: 30, 61, 64). The presence of trees on the site results in the presence of large root complexes in the affected areas, rendering some areas improper for excavation. Occasionally, there is a mottled horizon separating this layer from the subjacent layer. This layer is more or less mixed, with proportions of the two soils varying from area to area. The second layer is a brown to yellowish brown mineral soil (B). This layer is generally devoid of cultural materials on the Gaudreau site. Exceptions are present in the Ancient zone and on the lower terrace, where materials appear to have penetrated into the B layer (Graillon 2011: 17, 2012: 56).

2.4.3 Features

Few features are present on the Gaudreau site: five post molds (Graillon 2011: 66; 2012: 107), three combustion features (Graillon 2011: 65; 2013: 108, 109), a plausible storage pit, and a zone bedded with fire-cracked rock (Graillon 2011: 65, 66; 2012: 106). All of these features are located on the upper terrace. The five post molds were [identified] in the B level of units 69N-21W and 70N-21W during the 2010 excavation, though only the two present in unit 70N-21W were excavated during the 2010 season. Apart from confirmation that they were in fact post molds, the more southern of the post molds contained three flakes and the other four flakes (Graillon 2011: 66, Graillon 2012: 107). The other three, in unit 69N-21W, were excavated and profiled during the 2011 season and were devoid of cultural materials. Though charcoal was obtained from one of the post molds, no radiocarbon dating was undertaken due to the lack of proper funding. Soil samples were extracted from all five post molds, though at this time there seems to be no intentions regarding the analysis of these samples. Two of the combustion features are located in the Central sector of the site. The first of these, located in unit 85N-27W, is of relatively small size (approximately 60cm x 60 cm) (Graillon 2013: 108). The combustion feature was mostly dismantled, with stones partially in a circular pattern and some minor rubefaction visible on the B layer upon which it sat. No charcoal nor bone material was found within the feature, though a biface fragment and some flakes were found (Graillon 2013: 108). The second combustion feature is much larger, measuring approximately 125 cm by 110 cm, and is located in units 92N-24W, 92N-25W, 93N-24W, and 93N-25W (Graillon 2013: 109). Most of the soil beneath the feature is reported to have been rubefied and stones were present in a semi-circular pattern, although the feature appear to be partially dismantled. Two Terminal Archaic diagnostics and a single Middle Woodland diagnostic were found in proximity of the feature, as well as nearly three thousand flakes (Graillon 2013: 110). However, no charcoal was recovered from the feature. As such, this feature remains temporally ambiguous. The third combustion feature is present in the Ancient zone, in unit 77N-20W (Graillon 2011: 65). The features appear to have been nearly completely dismantled, being identified mainly due to the rubefaction of the soil in the B horizon and a large concentration of calcined bone in the Ap horizon. Mainly historic period materials are present near the feature, including a French gunflint and an early 20th century plastic pipe (Graillon 2011: 65). No charcoal was recovered from the feature. What appears to be a storage pit was found in unit 72N-19W. The feature was a patch of dark soil penetrating into the B layer containing both Early Middle Woodland potsherds and calcined bone (Graillon 2012: 104). Charcoal samples were recovered from the feature but have not been sent for analysis due to the lack of financial resources (Graillon 2012: 104). Units between west lines 21 and 25 in the Contact zone present a bed of fire-cracked rock at the surface of the B horizon (Graillon 2011: 65, 2013: 61). It is to be assumed that this accumulation of fire-cracked rock is the result of the dismantling of multiple hearth features during multiple occupations, dating as early as the Late Archaic in the Contact zone. There is complete absence of other features, such as post molds, within the bounds of the FCR bed. No charcoal samples were recovered from this feature, though any sample recovered would be easily challenged due to its uncontrolled context (absence of stratification and intermixing of assemblages).

2.4.4 Artifact distributions

Diagnostic lithic artifacts are present throughout the site, though they are completely absent from the North and West sectors. Table 2.4.1 summarizes the amounts of diagnostic artifacts per prehistoric period. The Terminal Archaic is the most heavily represented period on the site, followed by the Early Woodland. The bulk of these materials are found in the Contact zone, where all recognized periods on the site are represented. This area is problematic, as there is heavy intermixing between periods. Should polygons be drawn, using diagnostic artifacts as nodes, significant overlap of the resulting polygons can be observed in the contact zone (Figure 2.4.1). The mending of fragmented objects is also informative, as some pairs of refitted fragments present strong spatial differentiation, including fragments being present in different zones of the site. This displacement is problematic for the archaeological context, as it does not appear as though fragments were differentially rejected.

Densities of materials on the site are heavily skewed to the Upper Terrace, which boasts nearly nine-tenths of all artifacts recovered (Table 2.4.2). Flakes are the dominant artifact category, as they make up nearly 70 percent of the assemblage. Bone material represents nearly 30% of the assemblage, though the exact proportion of calcined bone to fresh bone is not displayed as this information is inconsistently presented in the reports.

Prehistoric ceramics are present on both terraces of the site and in most areas of the site, although they represent a meager three percent of the assemblage (Table 2.4.2, Figure 2.4.1, a, c). All ceramics were unearthed within the Ap level of the site on both terraces (Graillon 2013: 39, 96) The greatest concentrations of ceramics is found in the contact zone of the site, whereas they are essentially absent in the Central zone (Graillon 2013: 41, 99, 100). The Central zone is peculiar, as no ceramics are found north of line 88N on the Upper Terrace (Graillon 2013: 100). Ceramics attributed to the Early Middle Woodland, Late Middle Woodland, and Late Woodland periods are present on both terraces of the site (Graillon 2013: 49).

The lithic assemblage is heavily dominated by bifacial implements and by end scrapers, and materials on the site are overwhelmingly non-diagnostic (Table 2.4.3). There are relatively few expedient tools in the assemblage, though it must be considered that many more utilized flakes may still be unnoted among the near 70 000 flakes reported. Two ridged hammerstones are present in the assemblage, and may have been used in the production of macrotools. As for macrotools, the most important category is that of undetermined objects. This category is essentially a Pandora's Box of incomplete macrotools, either too ambiguous or too fragmented to be typed as another object. The site presents a good variety of macrotools, though most identified types have single examples. Hammerstones are considered in this category as they are not classified as chipped stone, and due to the occasional reuse of macrotools as hammerstones. The other important category of macrotools in the assemblage are netsinkers. All netsinkers on the site are notched, and some are made upon split cobbles.

Locally available raw materials heavily utilized to produce objects on the Gaudreau site (Table 2.4.4). Apparent functional differentiation is however present between locally available materials, as a vast majority of objects produced with silicified mudstone are bifaces at varying degrees of completion, whereas unifaces and expedient tools dominate the quartz assemblage. A similar dynamic, though less marked, is present between the cherts and rhyolites present in the assemblage: Unifaces and expedients represent the majority of chert objects, though bifaces are quite numerous, while the opposite is observed for the rhyolites, especially the Kineo-Traveller rhyolite. Exogenous raw materials in the Gaudreau collection are seldom from distances greater than 1000 km, apart evidently from the Mistassini and Ramah quartzites. Great lakes cherts are relatively well represented in the assemblage, with Onondaga and other mottled cherts representing around a third of the chert objects in the assemblage. The next group of importance are Appalachian cherts. Many undetermined cherts are also present. As for the rhyolites found on site, these materials are dominated by Kineo-Traveller rhyolite.

The presence of a relatively varied assemblage of raw materials is likely to be an effect of the repeated occupation of the site, as the probability of a given material circulating onto a given site is greater when a site is occupied over a large time span or occupied multiple times (Wilson 2007b). The presence within the assemblage of raw materials from all cardinal directions, with some occurring is very small quantities, is also unsurprising when the site's constant reoccupation is considered, as raw materials networks and the directionality of movement tend to change throughout time (Ingbar 1994). An examination of the diagnostic lithic artifacts can give a tentative look into the changes in raw material networks (Table 2.4.5). As these diagnostic objects cannot be strongly associated[4] directly to other objects, it is safer to

[4] Except for the Late Paleoindian material.

assume that raw materials noted are not specifically attached to a given period for the entirety of the assemblage. Only a single raw material is present for the Late Paleoindian diagnostics, a material initially identified as a trachyte (Graillon, et al. 2012). It was then identified as a pyroclastic rock (such as a tuff, water lain tuff, or ignimbrite), though after petrographic thin sections were examined, the material in question may potentially be a sedimentary rock of regional origin instead (Adrian Burke, personal communication 2015). The single object identified for the Middle Archaic, a stone rod, appears to be made of sandstone. This material is present in the region, though the appearance and qualities of the local material are unknown. For the Late Archaic, few sources are determined, as half of the objects are macrotools made of materials of unknown origins. For bifaces, local silicified mudstone is present, as are materials from Vermont, the Great Lakes, and Maine. The subsequent period, the Terminal Archaic, presents the greatest variability of raw materials of all periods recognized, with sources from Vermont, Maine, southern Quebec, and the Great lakes represented, with a continuity of some of the Late Archaic sources. However, the greater number of diagnostic bifaces of this period may be partly responsible for the greater number of sources. Early Woodland diagnostic lithics are unsurprisingly dominated by Onondaga chert, all evidently Meadowood bifacial scrapers or bifaces. Other materials such as Munsungun chert and Kineo-Traveller rhyolite are also used for two bifaces. A gorge is among the diagnostics, though the raw material from which it is made could not be identified. As for the Middle Woodland period diagnostics. raw materials utilized to produce Jack's Reef type bifaces follow the expected formula for southern Québec, wherein most (5 of 7 bifaces for Gaudreau) are made of Onondaga chert (Gates-St-Pierre and Chapdelaine 2013), while the remainder are made of locally available silicified mudstone. A lone Greene type biface made of an undetermined chert is also present in the assemblage. As for the Late Woodland, locally available materials such as quartz and silicified mudstone are the primary materials.

Though it may be tempting to assert that there are drastic changes to raw material networks, changes appear to be in line with the changes observed throughout the Northeast between the Archaic and Woodland periods, with the rise in usage of Onondaga chert during the Early Woodland, attributable to the Meadowood interaction sphere (Taché 2008). As well, the greater number of sources present in the Terminal Archaic may not be very significant, as the subsequent periods are much shorter (averaging around 500 years each, versus the 1 500 years of the Terminal Archaic). The fewer number of objects for these periods is a likely source of bias for source areas, as the sample sizes per period are smaller and more likely to over-represent sources.

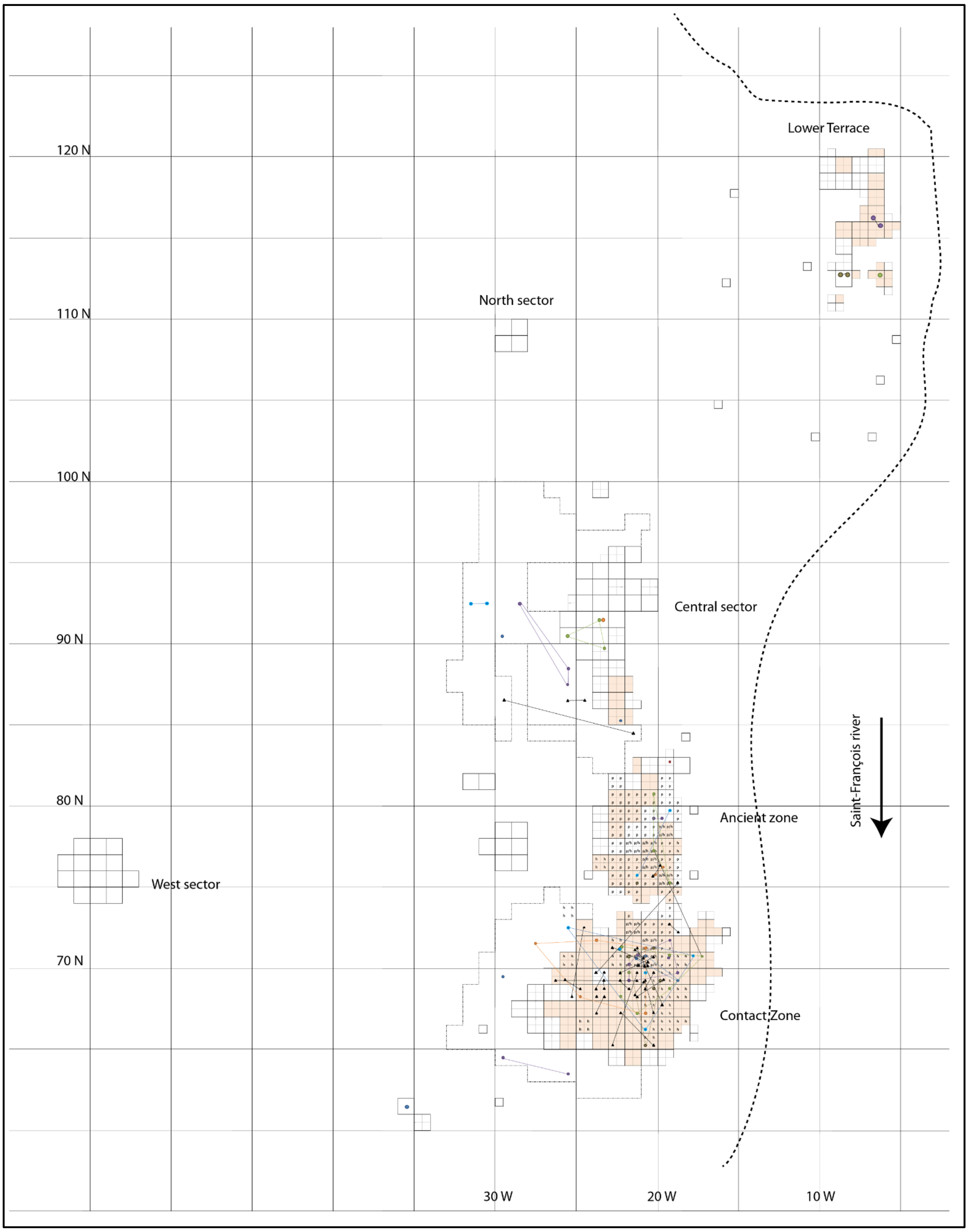

Figure 2.4.1: Gaudreau site map. Refer to figures 2.4.1a, b, and c for further details.

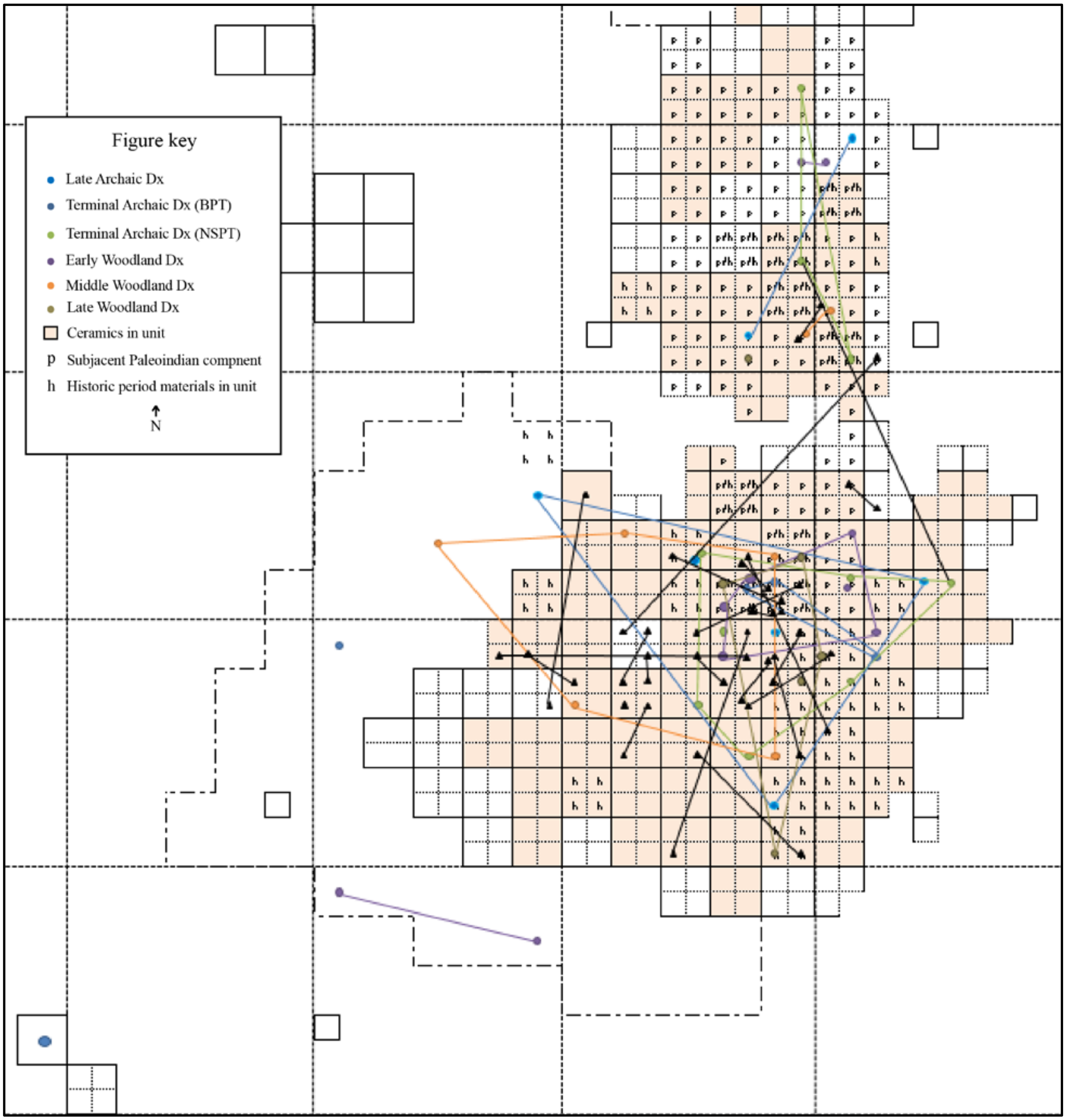

Figure 2.4.1a: Distribution of diagnostic materials in the Contact zone (south) and the Ancient zone (north). BPT: Broadpoint Tradition, NSPT: Narrow Stemmed Point Tradition, Dx: Diagnostic materials. Triangles joined by lines represent mended object fragments.

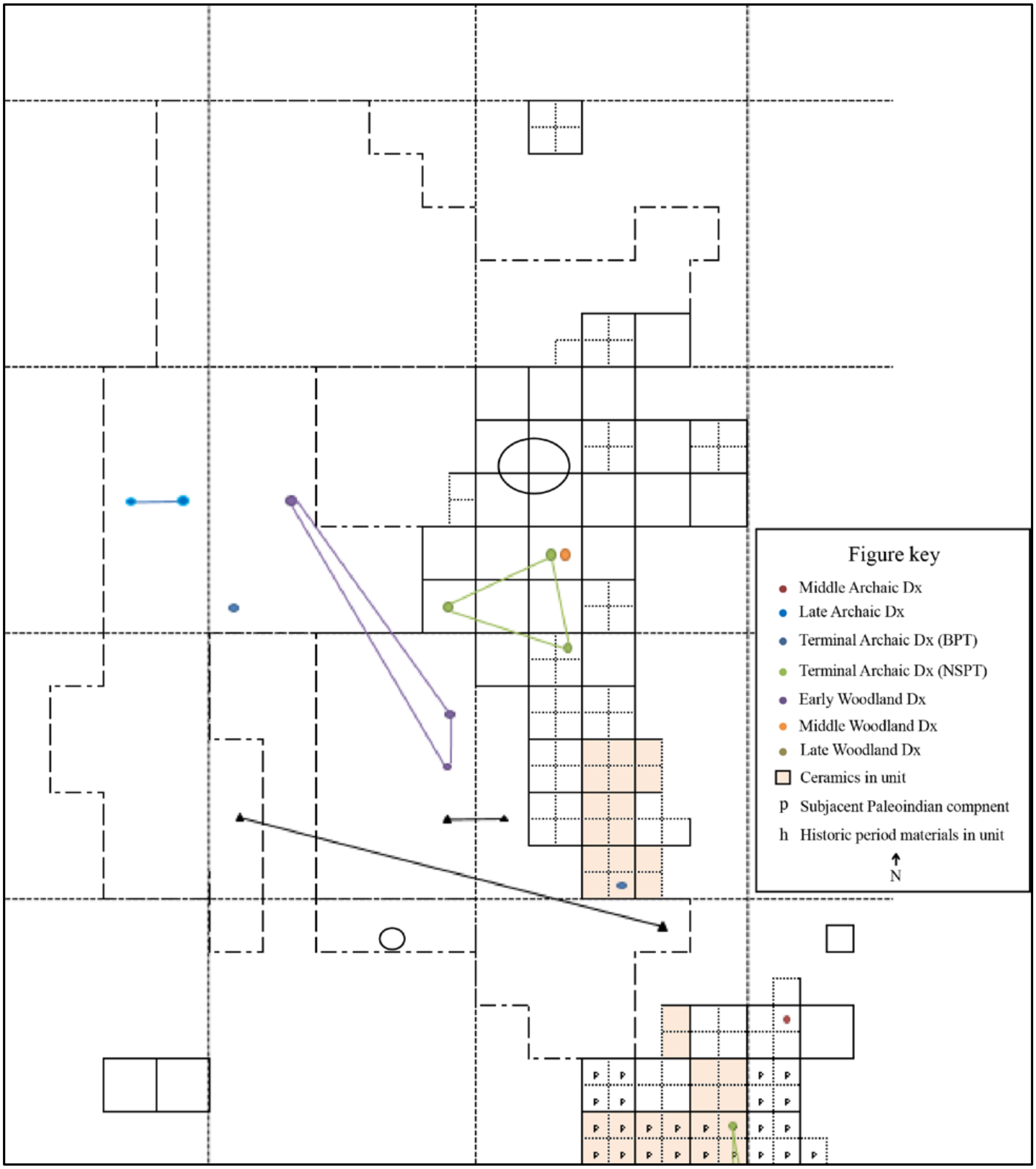

Figure 2.4.1b: Distribution of diagnostic artifacts in the Central sector. BPT: Broadpoint Tradition, NSPT: Narrow Stemmed Point Tradition, Dx: Diagnostic materials. Triangles joined by black lines represent mended object fragments. Ellipses denote the placement of the combustion features described earlier.

Figure 2.4.1c: Placement of diagnostic artifacts on the Lower Terrace (right) and in the North sector (left). NSPT: Narrow Stemmed Point Tradition.

Period	Amount
Late Paleoindian*	5
Middle Archaic	1
Late Archaic	9
Terminal Archaic	21
Early Woodland	14
Middle Woodland	8
Late Woodland	7
Total	66

Table 2.4.1: Totals of diagnostic artifacts per period. The table includes not only diagnostic bifaces, but also macrotools and other lithic objects. Asterisks indicate periods that are not illustrated in figure 2.4.1.

Upper terrace	
Tools, stone	889
Tools, bone	7
Flakes	59068
Ceramics	2798
Bones and teeth	24914
Historic period materials	343
Samples	51
Total	88070

Lower terrace	
Tools	124
Flakes	9095
Ceramics	496
Calcined bone	4620
Fresh bone and teeth	92
Historic period materials	176
Samples	8
Total	14611

Table 2.4.2: Artifact[5] totals for both terraces of the site at the end of the 2012 field season. Composited from information available in Graillon 2011, 2012, and 2013.

[5] Totals for tools and ceramics are pre-mending totals, i.e. fragments are considered fully fledged objects even if they are mended with another fragment.

Chipped stone		
Bifacial		
	Bifaces*	338
	Points*	93
	Drills*	15
	Graver	2
	Crested Hammerstone	2
	Total	450
Unifacial and other		
	Retouched and utilised flakes	71
	End Scrapers	309
	Side Scrapers	5
	Concave scrapers	5
	Overshot flake	1
	Cobble tools and blanks	9
	Undermined	2
	Wedge	73
	Total	475
Cores		3

Macrotools	
Abraders	11
Hammerstones	14
Netsinkers	14
Abraded point	1
Adzes	5
Atlatl weight	1
Axes	5
Bayonets	2
Gorget*	2
Gouge	1
Pitted stone	3
Rod	1
Ulu	1
Undetermined macrotools	29
Total	90

Table 2.4.3: Totals of lithic objects per object type. Asterisks indicate that mended fragments were considered as whole objects within the total.

Raw material	Bifaces	Other bifacial objects	Expedient objects	Unifaces	Cores	Hammerstones	Total
Appalachian cherts	17	5	12	42	0	0	76
Mount Independence chert	9	0	6	3	0	0	18
Munsungun chert	3	0	3	15	0	0	21
Onondaga and mottled grey cherts	30	1	21	67	0	0	119
Selkirk chert	1	0	0	0	0	0	1
Undetermined cherts	63	2	11	46	0	0	122
Hornfels	6	0	0	0	0	0	6
Undetermined Jasper	0	0	0	1	0	0	1
Silicified mudstone	188	1	9	6	0	0	204
Quartz	21		71	117	3	8	220
Cheshire quartzite	6	3	0	0	0	0	9
Mistassinni quartzite	2	1	0	5	0	0	8
Ramah quartzite	1	0	0	0	0	0	1
Undetermined quartzites	1	0	2	1	0	0	4
Ascot formation rhyolite or Mont Marbre rhyolite	5	0	1	0	0	0	6
Kineo Rhyolite	51	4	7	11	0	0	73
Mount Jasper Rhyolite	1	0	0	0	0	0	1
Undetermined rhyolites	11	0	0	0	0	0	11
Unknown altered cherts or rhyolites	5	0	0	1	0	0	6
Unknown	11	0	9	3		7	30
Total	432	17	152	318	3	15	937

Table 2.4.4: Raw materials present in the lithic assemblage organized by object category. Macrotools are not included as the raw material of more than 50% of the objects in this category were undetermined.

Raw material	Period: Late Paleoindian	Middle Archaic	Late Archaic	Terminal Archaic	Early Woodland	Middle Woodland	Late Woodland	Total
Appalachian cherts	0	0	1	3	0	0	0	4
Mount Independence chert	0	0	1	2	0	0	0	3
Munsungun chert	0	0	0	0	1	0	0	1
Onondaga and other Great Lakes cherts	0	0	1	0	11	5	0	17
Selkirk chert	0	0	0	1	0	0	0	1
Other cherts	0	0	0	2	0	1	1	4
Hornfels	0	0	0	1	0		0	1
Silicified mudstone	0	0	1	2	0	2	3	8
Cheshire quartzite	0	0	0	2	0	0	0	2
Quartz	0	0	0	1	0	0	1	2
Kineo rhyolite	0	0	1	5	1	0	0	7
Mount Jasper rhyolite	0	0	0	0	0	0	1	1
Other rhyolites	0	0	0	1	0	0	0	1
Sandstone	0	1	1	0	0	0	0	2
Shale	0	0	1	0	0	0	0	1
Slate	0	0	2	0	0	0	0	2
Undetermined	5	0	1	1	1	0	1	9
Total	5	1	10	21	14	8	7	66

Table 2.4.5: Raw materials of diagnostic lithic artifacts identified on the Gaudreau site.

2.5 Occupations

The Late Paleoindian component is relatively well circumscribed within the Ancient zone: The occupation covers an area of approximately 36 meters square, with all relevant artifacts having been recovered within the B horizon at depths greater than 20 to 30 centimeters below surface (Graillon, et al. 2012). The assemblage comprises 520 flakes, 14 utilized flakes, 5 St. Anne/Varney-like bifaces, 3 bifacial fragments, a bifacial drill bit, and an ambiguous unifacial tool, all made of an undetermined volcanic rock (Graillon, et al. 2012). The flake assemblage is interpreted as being mainly the result of the finishing and the retouching/resharpening of bifacial pieces. The absence of other raw materials in this sub assemblage is considered peculiar, as the other published Paleoindian occupations in the region, from the Cliche-Rancourt site, present multiple raw materials (Chapdelaine 2007; Graillon, et al. 2012). Among the raw materials present within the Paleoindian components at Cliche-Rancourt are the Kineo-Traveller rhyolite, the Mount Jasper rhyolite, the *Montagne de Marbre* rhyolite, and the Munsungun Lake chert (Burke, et al. 2014). Though these materials are absent within the Late Paleoindian component of the Gaudreau site, they are present among the other occupations of the site (Graillon, et al. 2012).

No Early Archaic presence is noted in the assemblage, though this may be in part due to the non-specificity of Early Archaic lithic technology. Though a Middle Archaic occupation is proposed in the Graillon reports, the evidence of this occupation is not compelling. The two bifaces (BkEu-8.488 and BkEu-8.722) attributed to the Stark-like type are fragmentary, notably lacking their hafting section, precluding definitive identification. Graillon's argumentation is hinged mainly on these two pieces and their discovery at the base of the Ap level. As mechanical disturbance of this level is significant, it is doubtful that their vertical placement within the level has any relation to their moment of deposition. There is, however, what appears to be a polished stone rod (BkEu-8.2524) within the assemblage. This artifact type is generally attributed to the Middle Archaic period in the neighboring state of Maine (Petersen 1995). As for the Late Archaic, materials are few and broadly spread throughout the site. There are no zones that are clearly Late Archaic in nature, and the bulk of Late Archaic diagnostics are evidently found in the Contact zone. In fact, most Late Archaic diagnostic materials on the site are essentially isolated finds, with only two diagnostic objects in adjacent units in the Central sector. It can be assumed that Late Archaic occupations were relatively short, though intermixing may explain this perceived shortness of occupations. Diagnostic materials dating to the Terminal Archaic are present in all areas of the site, including the lower terrace, although the greatest concentration of these materials is located in the Contact zone. The Terminal Archaic presence on the lower terrace is limited to a single Lamoka-like biface of relatively small size, unearthed in the Ap level (Graillon 2011: 21). Two dynamics are visible for Terminal Archaic diagnostic objects. First, Narrow Stemmed Point Tradition artifacts tend to occur more commonly in nearly adjacent units. Second, half of the Broadpoint Tradition diagnostics occur as isolated objects in regards to other objects of the same period. NSPT diagnostic materials are also more common on the site, so this may also be due to shorter or less frequent BPT occupations of the site.

The Early Woodland period suffers the same fate as the Terminal Archaic: Although it is present on both terraces, its presence on the Lower Terrace is limited to two fragments of a same gorge (Graillon 2013: 49). Though ceramics attributable to this period are absent on the Lower Terrace, thirteen rimsherds and around twenty body sherds attributed to the Vinette 1 type were unearthed in the Ancient zone during the 2010 and 2011 field seasons (Graillon 2011: 55, Graillon 2012: 84). The occupation is otherwise represented by Meadowood bifaces (N=4) and end scrapers (N=13) on the Upper Terrace (Graillon 2013: 119). The strongest concentration of artifacts of this period is located evidently in the Contact zone, along with most of the other observed periods. The opposite is noted for the Middle Woodland period, which only presents diagnostic lithics on the Upper Terrace, whereas ceramics of this period's two sub-periods are present on both terraces (Graillon 2013: 48, 119). Oddly, an isolated Greene-like biface is present in the Central sector, far from any ceramics (Graillon 2013: 110). Though it is possible to assume that it is an idiosyncratic find, it also likely to result from an occupation that succeeded in the act of not accidentally (or purposefully) destroying their cooking/storage vessels. Otherwise, Middle Woodland occupations on the site appear to be non-substantial, much like occupations of the other recognized periods. As for the Late Woodland period, occupations are present in most areas of the site, but are completely absent from the Central sector. Ceramics, including a fragmented trumpet style smoking pipe, and lithics dating to this period's two sub-periods are present on both terraces (Graillon 2013: 49, 120).

The recurring theme of the occupations present on the site is that they are of relatively short duration, and most likely of small extent. The substantial assemblage of the site is likely to have been formed through many repeated short-term occupations over the span of around 10 000 years. This may in part be due to the strategic placement of the site at the convergence of two rivers that allow movement both towards the east, towards Mégantic Lake and Maine, and to the south and west, eventually towards the St. Lawrence River and to Northern New England.

2.6 Cursory examination of the rhyolite sub-assemblage

In the context of a graduate-level directed reading, the rhyolite sub-assemblage of the site was examined to provide a better look at the utilization of rhyolite at the site. Rhyolites, primarily Kineo-Traveller or Montagne-de-Marbre, compose roughly 20% of the lithic assemblage (11 227 flakes and 68 individualized objects). Rhyolite flakes are reported in all units on the upper terrace, and less so on the lower terrace. This high proportion of rhyolites is not unusual for the region, as rhyolites tend to be consistently the third most represented material on most sites after locally available silicified mudstone and quartz. Other authors have proposed that the use of rhyolites in the region is primarily during the Archaic period (Corbeil 2007), though Woodland sites such as the Rivière Magog site (Arkéos 1999), and even the primarily Woodland period workshop site near the Montagne-de-Marbre source contradicts this interpretation (Graillon and Costopoulos 1997). Although temporally diagnostic materials made of rhyolites are primarily of Archaic sub-periods on the Gaudreau site (minus a heavily reworked Meadowood notched biface), most objects are non-diagnostic.

There is a large variation of biface forms, in terms of completion, shaping, and techniques, a fact that reiterates the extensive occupation of the Gaudreau site. Bifaces were grouped into six technical groupings, with degree of completion being relevant to only one group (n=2) of rather large bifaces. No groupings are temporally diagnostic, though it should be noted that two bifaces have technical attributes eerily similar to NSPT bifaces, namely being relatively narrow and thick and presenting generally semi-abrupt removals along their entire length. Rejection of the examined bifaces appears in general to have been due to the failure of the pieces during shaping at relatively advanced moments of production.

Some technical variation is noted among endscrapers (n=7), wherein two primary categories were elaborated. The first is of end scrapers made upon soft hammer percussion flakes. The blanks of the scrapers appear primarily to have been obtain through the *débitage* of cores, though it should be noted that one object in this group was made from a bifacial thinning flake. This latter example appears to suggest that site occupants occasionally salvaged flakes produced through shaping if they presented characteristics deemed adequate for the production of a scraper. Within this group the active section is generally retouched opposite of the striking platform, except in one instance wherein the striking platform was retouched into a usable edge. Scrapers in this group are evenly split in terms of lateral retouch, with half presenting no retouch and the remaining presenting complete lateral retouch. The remaining scrapers (n=3) were placed in a second group, wherein the initial characteristics of the blank utilized to produce the object is unknown as all edges are retouched and the striking platform has been obliterated by retouch. The shape and size in this group is quite variable

Two multidirectional cores were also examined. Although the blanks obtained from both cores differ greatly in size and likely function, the volumetric concept[6] utilized by the knappers is quite similar. In both instances knappers wished to produce the longest and largest blanks possible from the volume of material at their disposal, however without predetermination. The result is that the users preferentially chose to remove flakes from the longest axis. The

[6] In this instance volumetric concept refers to the knapper's conception of the volume of the objective piece at given moments of an operational sequence and how this volume should be managed and used. For a longer discussion, consult Desrosiers 2009.

accumulation of such removals resulted in a relatively triangular cross section for one of the cores. Knapping techniques utilized on the cores was however different. The larger of the two cores, of an undetermined rhyolite, presented removals negatives more consistent with hard hammer percussion (more pronounced bulb negatives), whereas the removals on the smaller core, made of Kineo-Traveller rhyolite) were more consistent with soft hammer percussion (diffuse bulb negatives, likely due to the use of a soft percusser). This second core is more consistent with the choice of site occupants to utilize flake blanks produced through soft hammer percussion.

A sample of 1000 flakes was also examined. Sampling was done in proportion the total number of rhyolite flakes in the different site areas, resulting in the examination of 460 flakes from the Contact zone, 100 flakes from the ancient zone, 380 flakes from the North sector, and 60 flakes from the Lower Terrace. Complete or quasi-complete flakes from the densest units of these areas were selected for analysis, as these flakes retain the most technical information. The sample is dominated by bifacial thinning flakes (BTFs) in all areas, with proportions of these flakes varying from 49% to 78% of the examined flakes. The lowest of these (49%) occurs in the contact zone, which also happens to be the site area with the highest proportion of pressure flakes (36%) when compared to the site average (18%). It should however be noted that this extreme difference may be in part due to the sampling strategy utilized (smaller flakes tend to be less fragmented) and due to differential recovery (The North sector not only presents a proportion of 78% BTFs, but also is the only area where screening was limited to the ¼ inch mesh). These differences in flake types per area seem to suggest that shaping was the primary activity conducted with rhyolite in most areas, with the retouching of completed bifaces being a more important activity in the Contact area. The importance of shaping in the flakes sampled implies that rhyolite objects arrived on site generally as non-completed forms. It is also of note that, of the flakes sampled, approximately 85% are of Kineo-Traveller rhyolite or of the Montagne-de-Marbre rhyolite.

The use of rhyolites in the Gaudreau site assemblage emphasizes primarily the production and completion of bifacial implements, though the production of blanks for unifaces is also present to a lesser degree. The strong representation of Kineo-Traveller rhyolite, or a similar rhyolite such as Montagne-de-Marbre, and the evidences suggesting that most rhyolite objects arrived on site as uncompleted forms suggest either direct acquisition of this material or oddly consistent and intensive indirect acquisition. The latter option seems unlikely, as does consistent direct acquisition of Kineo-Traveller rhyolite, which occurs in primary context at distances greater than 200 kilometers. It can therefore be suggested that the Montagne-de-Marbre source may be a likely candidate for the acquisition of rhyolites for the occupants of the Gaudreau site. This proposition would require geochemical analysis for confirmation or falsification.

3. Materials and methods

3.1 Material sampling

The sampling of lithic materials in any context depends on the scale of analysis authors wish to use and must also relate to the methods used by the analyst. In this case, I wish to analyze materials at the scale of individual production or curation events, as the purpose of the analysis is to compare individual production events in terms of the application of techniques. At this scale, aggregate methods, such as mass analysis and flake characteristic approaches are ill suited, as such methods are more appropriate at assemblage and sub-assemblage levels, as such methods would create a sample equal to the amount of sub-divisions that can be created plus the objects examined, without necessarily demonstrating the link between objects and flakes (Two samples would exist; a first, composed of objects, wherein one object would be equal to one element of the sample. The second, wherein an element of the sample would be equal to a delimitation of the assemblage, for example all the flakes from a given area of the site). In no instance outside of comparing flakes to discuss flake properties should the number of flakes be considered as the number of elements in a sample, as single mixed flakes do not correspond to a given entity. The splitting of assemblages through Minimal Analytical Nodule analysis (e.g. Hall 2004; Knell 2004) can provide a larger and stronger sample in controlled contexts, though ideally refitting should be used as to assure the relation between flakes, debris, and objects, creating properly defined and delimitated production events (Bleed 2004). In such an instance, the sample size would be equal to the total number of refitted units and objects without refits (One element of the sample would be equal to an object and all the flakes refitted upon it). As no associations can be made between objects present in the Ap layer due to its disturbed and uncontrolled context, only Archaic diagnostic materials were analyzed. The resulting sample is composed of 26 diagnostic bifaces and of 6 macrotools, for a total sample of 32 discrete production/curation events. Though such a sample may be relatively small if viewed from a statistical perspective, the methods applied for the analysis aim at producing thick descriptions rather than statistically treatable measurements. As such, this apparently small sample size is sufficient to achieve the goals of this thesis, as the examined material will provide both information on the exchange networks (through the identification of material origins), and information of the ontology of the materials examined, though their technical description. Of the objects analyzed, 1 is of the Middle Archaic, 10 are of the Late Archaic, and 21 are of the Terminal Archaic. This selection rests upon the following assumptions, that have been thoroughly discussed (Ford 1952, 1954; Spaulding 1953): I) Types, as defined by archaeologists, represent delineations that are not only existent but consistent through time. II) As such, types are traditional and repeated forms of a technology. These assumptions, within the current study, allow for the addition of the following assumptions: III) Types, as a technology, represent a shared project and meaning in the context in which they are observed. IV) For bifaces, shape and volume are not simply a question of style but the accumulation of knowledge, know-how, material properties, skill, and a shared conception of what the form of a biface should be (project). This sampling approach evidently leads to multiple problems in terms of methodology. As flakes and other non-diagnostic materials are absent from the analysis, only a partial picture of the technical system can be observed, as only the final moments of production and curation of certain diagnostic artifacts can be observed. This absence will evidently have effects on the presence and absence of different raw material source areas, as it is unlikely that all materials used on a site will leave evidence in a diagnostic form. This reliance on typology also rejects pieces that do not fit into a pigeonhole due to ambiguity, for example: Objects presenting traits of multiple types or simply being untyped. Doing so also biases against innovation and against the lower limits of the skill spectrum, since in both case objects may not conform to the recognized types. The analysis must therefore not be taken at face value, as it is likely to not represent a significant portion the possible variability of the relevant archaeological periods.

As there is no use of high-magnification microscopy microwear analysis, the functions of objects cannot be ascertained to a reliable degree (Keeley 1974). Functions will be hinted at through macroscopic evidences when present, but equifinalities will be presented as counter-examples. In the same vein, objects otherwise presented as points, preforms, knives, etc. will simply be named bifaces as to avoid implying function. Though other functionally neutral denominations exist (ex. Hafted biface, finished biface), their use relates to models where distinct stages are recognized in bifacial shaping (Callahan 1979; Whittaker 1994: 153-159). In the case of preforms, though some bifacial shaping sequences do present an observable and contextually relevant preform stage, for example Mansion Inn bifaces (Cross 1993; Dincauze 1968), such preforms are also a finished product, wherein a fork is present in the sequence: either the object is transferred into a ritual context, remaining essentially unchanged apart from its ritual “killing”, or gains/maintains a utilitarian function and may be retouched into another diagnostic form.

3.2 Artifact analysis

3.2.1 Analysis of bifaces

Technical drawings

Following typological identification, all relevant diagnostic bifaces were drawn at full scale. Millimeter graph paper was selected to allow for easier visual estimation of the invasiveness of removals and retouch. Out of convenience, a 0.7mm mechanical pencil was utilized to sketch the drawings. It must however be taken in consideration that the diameter of the graphite inserts limits the minimal size of removals that can be drawn, i.e. removals smaller than the insert’s diameter or of very small size cannot be drawn reliably. The steps followed to produce the drawings is loosely based upon the method outlined in Chapter 7 of Inizan, et al. (1995): The artifact to be drawn is placed in a leveled position upon a paper. Lines are then drawn in continuation of the major and minor removal scars on the artifact (Inizan, et al. 1995:117). Though it is indicated that a folded paper must be used to produce these lines, it was not deemed necessary to do so as lines produced in freehand with the observer’s eye placed at 90 degrees above the removals scars produced sufficiently accurate results, that could be corrected if need be. The contour was completed by joining the interior extremities of the lines by a continuous line, with continued observation of the artifact throughout. Out of convenience, the dual compass technique was not used in the tracing of the removal scars. Instead, the pencil was held as a plumb-bob above the piece and lowered above intersections, with a dot placed at the corresponding area after the piece is removed. Dots were then counter-verified with the piece in a continuous manner and joined by a line. Removal negatives and counter-bulbs were then sketched in a relatively approximate manner, due to the incipient nature of the observer's drawing proficiency. Drawings were then scanned at 300 dpi resolution with a digital scanner, to be finalized using the Adobe Illustrator program. The artifacts drawn were kept at hand for continued corrections and to counter-verify the orientations of the flake negatives. The material textures proposed (Inizan, et al. 1995: 121) were not used as they were considered an undue complexification of the task. Cortex was still however represented by a dotted surface. Transverse fractures, cleavage planes, and undeterminable surfaces were left blank. Color photographs of the faces were taken as to present the color and texture of the materials with sufficient accuracy. Lateral, proximal, and distal edges were photographed with a digital camera, then imported and drawn in the Adobe Illustrator program.

Diacritical analysis

Diacritical analysis, or "mental refitting", allows the analyst to retrace the final gestures and choices on a finished/rejected piece or a specific moment of a refitted sequence, through the observation and the ordering of flake negatives on a piece (Inizan, et al. 1995: 131). Relations between sequenced removals and prior removals are also observed. The method relies mainly upon actualist (experimental) literature (Callahan 1979; Crabtree 1972; Whittaker 1994) to interpret the visible stigmata and the processes at work, knowledge of fracture mechanics (Bertouille 1989) and upon the knowledge and know-how of the analyst[7]. Such an approach to the observation of the piece allows not only a very systematic observation, but also allows the analyst to put order to actions and to facilitate the interpretation of conceptions of volume and

[7] Disclosure: The author has knapped with varying frequency during the past three years, generally bifacial shaping upon obsidian, dacite, novaculite, chert, and Kineo-Travellor rhyolite. Other experiences include the grinding, battering, and pecking of shale. In no way is the author to be deemed an expert or accomplished flintknapper.

of choices during production. Techno-functional groupings can be applied to distinct removal groups following their identification by the analyst. Two primary techno-functional groups are generally identified: Transformative and Prehensile (Boëda 2001). The transformative group refers to the techno-functional group that, through applied force, interacts with a given material. In other words, it is the likely active section of a given tool. As for the prehensile group, it refers to the techno-functional group that is likely the element of a given tool to be held or hafted and to which the user is capable of applying forces.

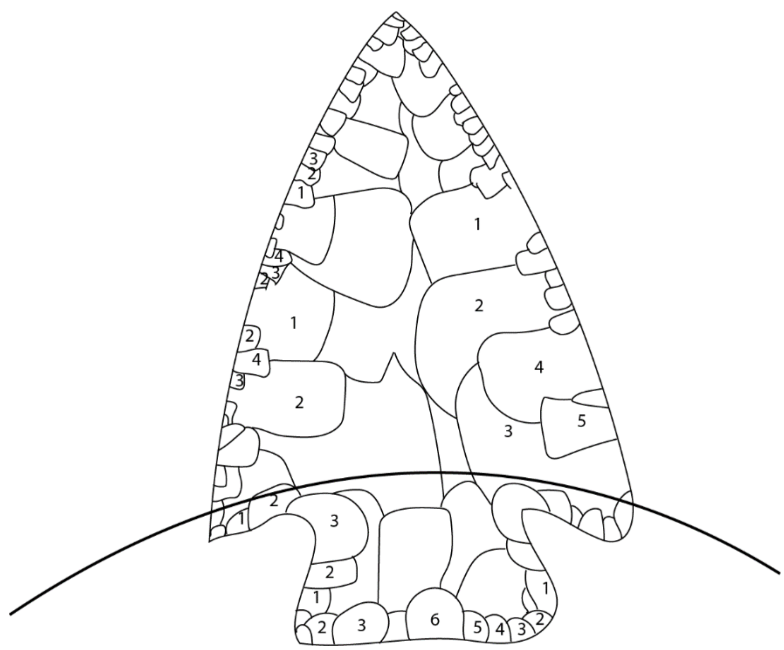

Figure 3.2.1: Idealization of a diacritical scheme on a single face of an imagined artifact. Removals are numbered when possible. The curved line separates the active techno-functional group (above) from the prehensile techno-functional group (below).

Considering the effects of resharpening and choices made during resharpening on the form and volume of bifacial pieces (Andrefsky 2006; de Azevedo, et al. 2014; Flenniken and Raymond 1986; Sollberger 1971), it is expected that pieces in the collection are resharpened at least to a minimum degree. As such, removals were grouped in accordance to their perceived technical grouping, i.e. if removals are identified as being a result of the shaping of the piece, its retouch, or the resharpening of the piece. Simply from the perspective of the mechanics, techniques and from a conceptual perspective, retouch and resharpening are essentially identical, with the latter simply being retouch done with the intent to renew a usable edge. Their separation by the observer is an arbitrary choice to transform similar technical units into distinct meaningful ensembles.

3.2.2 Analysis of Macrotools

The surfaces of macrotools were observed macroscopically with the aid of a 10x magnification hand lens and approximate angles of tangent surfaces were noted. The presence of striations resulting from grinding (Adams 2002: 77), ablation due to battering, conchoidal and subconchoidal removals and edge damage due to percussive techniques (Adams 2002: 151-153), and sheens due to polishing (Adams 2002: 77) were observed and noted. Counter verification of the assemblage for artifacts relevant for the operational sequences was done in an effort to supplement the information available from the visible stigmata.

3.2.3 Raw materials

Raw material was observed macroscopically on all analyzed objects with the aid of a 10x magnification hand lens. Characteristics such as texture, translucency, matrix, grain size, mineral inclusions, fossils, and color were observed (Codère 1998: 20-26). Attributions of rock types were given following observation and then compared to samples in the *Collection de Référence Lithique du Québec* for more precise identification. If plausible sources were identified, source area was noted. If source could not be identified, or if rock type could not be identified further than its geological origins, raw material is noted as being an undetermined type, ex. undetermined chert, undetermined volcanic, etc. As no petrographic methods nor geochemical methods (ex. XRF, PIXE, ICP-MS, etc.) were used during the identification of raw materials, the accuracy and exactitude of the identifications are greatly reduced. Macroscopic examination and identification of stones using a reference collection is highly dependent on the experience of the analyst and the quality of the reference collection utilized. The source and regional identifications should therefore be taken with a large grain of salt.

4. Results

4.1 Raw materials

A total of seven types were identified for the Late Archaic period, five of which are of macro-tools, the remaining two being bifacial types. The limitations of macroscopic raw material identification are evident for the artifacts of this period. Of the five macro-tool types, only one of the five objects has an identifiable source region, being a locally available dark grey shale. The other materials are undetermined slates (2), undetermined metamorphic, and an undetermined sandstone. Part of the failure to identify the source region is due to the absence of these raw material types from the C.R.L.Q. reference collection, which mainly contains fine-grained siliceous stones, ideal for chipped stone projects, but rarely used to produce macro-tools in the Northeast.

A second limitation is evident for the two bifacial types of the Late Archaic. Though only five bifaces were identified, ten potential source areas were identified (Figure 4.1.1). Five of those source areas are for a single artifact, made of a green chert bearing similarities to the Appalachian cherts. Three Terminal Archaic bifaces, of three types, also suffer from this same ambiguity. Appalachian cherts, such as Normanskill, Hathaway, Touladi, La Martre, Quebec, and Munsungun have very similar ranges of color (Grey, green, mottled grey and green, olive, black), matrix, and texture, and all present radiolarians (Boulanger, et al. 2005; Burke 2002; Chalifoux, et al. 1998; Codère 1996; Pollock, et al. 1999; Prothero and Lavin 1990). The commonality of these visual characteristics renders macroscopic identification of different sources hazardous for Appalachian cherts. The La Martre chert can also distinguish itself due the presence of bioforages, though these disturbances are not present in all variants of the chert (Burke 2002). The proper identification of the source of the artifact would require geochemical analysis.

Four other of the objects have multiple potential source areas, one Late Archaic biface (1 type) and three Terminal Archaic bifaces (2 types). These objects are made of what appears to be

Kineo-Traveller rhyolite. This denomination is utilized as both rhyolites are visually identical and since the geological formation from which both rhyolites originate, the Piscataquis volcanic belt, is present over a large area of northern Maine (Hon, et al. 1992). Though macroscopic identification is unable to distinguish the source area, differentiation is possible on geochemical grounds (Putnam 2012). Though Montagne de Marbre rhyolite can be visually identical to both rhyolites (Codère 1996), the lack of positive geochemical identification of this material on archaeological sites leads the author to suggest that it is unlikely that this material is a plausible source candidate, though the strong presence of green porphyric rhyolites in the assemblage and evidence for lithic production with these materials suggests rates of acquisition more consistent this source.

Three objects, of one Late Archaic type and two Terminal Archaic types, were made upon Mount Independence chert. The variety observed in the assemblage is similar to the variety described by Boulanger and Hathaway (2006) as being exploited at prehistoric quarries: semi-transparent, dark grey to black in color, having a slightly grainy texture, and presenting visible pyrites. It is however to be noted that pyrites were only observed subsurface on object BkEu-8.1707&697 with the aid of a stereo microscope at around 30x magnification. Also of note is that the objects displaying translucidity (n=2) presented a beige-ish hue during observation. This is likely due to the depositional environment, i.e. color was altered over time due to soil chemistry.

Two objects, of two Terminal Archaic types, are made of Cheshire quartzite. This raw material is present in a North-South band in the Green Mountains of Vermont, outcropping at various areas (Boulanger and Hathaway 2006). One of the objects appears to have been heated, become slightly more opaque and presenting slight reddening. This is contrary to the results obtained by Boulanger and Hathaway (2006), who observed greater transparency and loss of color following heating. It is therefore likely that the object's raw material may have been misidentified by the observer of the current study. Geochemical analysis would be necessary to confirm or infirm its identification.

Two objects, one of a Late Archaic type and another of a Terminal Archaic type, are made of cherts from the Great Lakes. One is made of what resembles Onondaga chert, and the other bears similarities to numerous samples of Great Lakes cherts available in the C.R.L.Q. reference collection, with greater similarities to the Selkirk, Collingwood and Manitoulin cherts. Due to their ambiguity, larger source regions are given for both objects.

One object, of a Terminal Archaic type, appears to be made of hornfelsified shale. Only one major source utilized by prehistoric populations is known within a 200 kilometer radius, outcropping at Mount Royal, on the island of Montreal (Gates-St-Pierre, et al. 2012). Other sources may exist closer to the site as the relevant formation protrudes at multiple areas, but no prehistoric quarries of this material have yet to be observed in Quebec apart from the Mount-Royal source (Burke 2007a).

Three objects, of one Late Archaic type and of one Terminal Archaic type, were made upon the locally derivable silicified mudstone. A primary geological source of the material is present in the vicinity of St-François Lake, 30 kilometers from the site (Burke 2007a). The material is also available in the form of cobbles in river beds and tills throughout the region (Codère 1996). Of the three objects, two are red in color, whereas the third is dark grey.

A single object, of a Terminal Archaic type, is made of milky quartz. Though quartz is locally available, it does not necessarily mean that it was obtained locally, as this material is essentially available on a planetary scale. It is therefore considered to be of unknown origin.

Four objects, of three Terminal Archaic types, are of undetermined materials. One is of an undetermined banded spherulitic rhyolite, two are of altered cherts, and one is of an altered chert or rhyolite. Further investigation would be necessary to identify the raw materials.

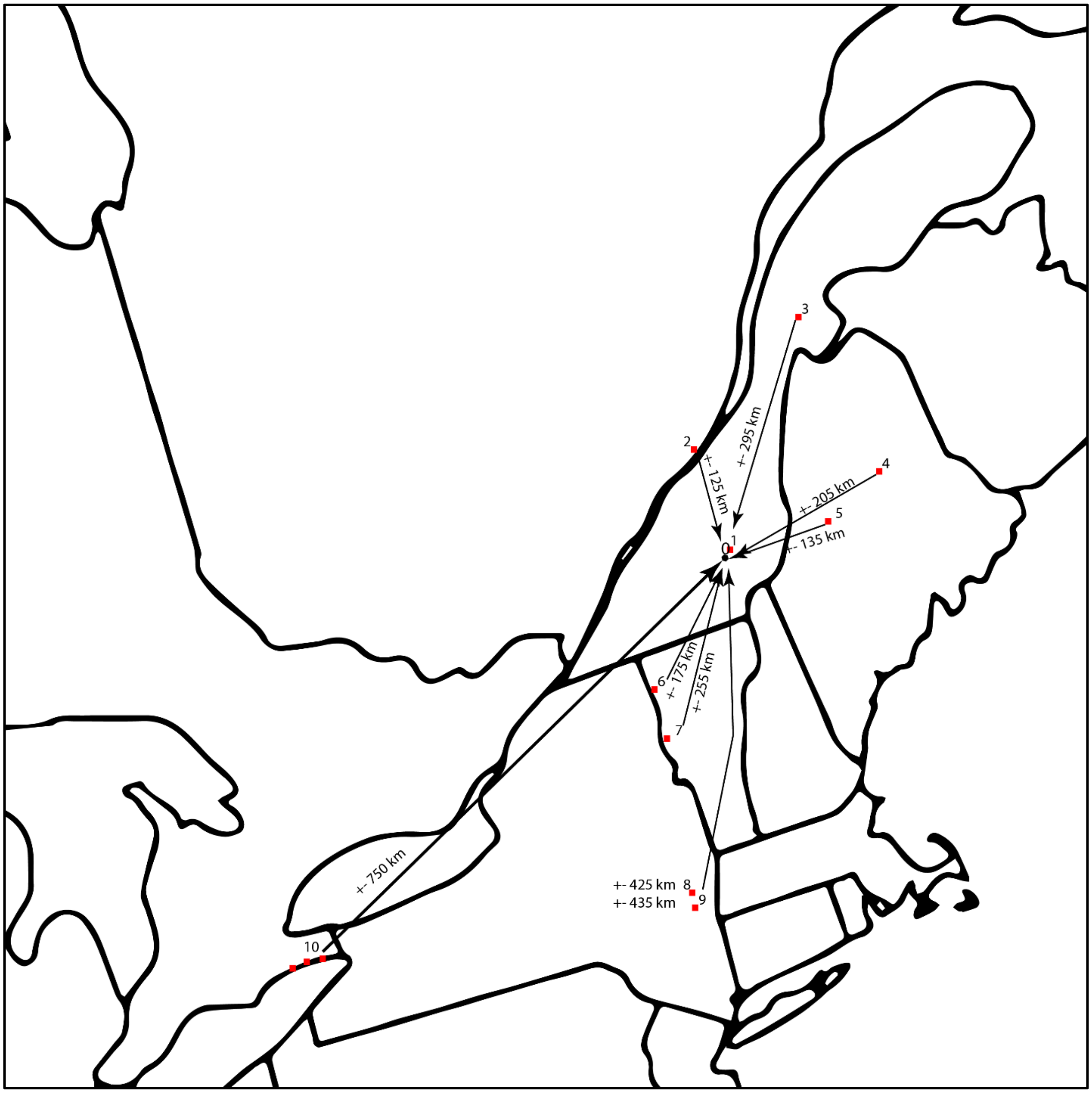

Figure 4.1.1: Potential lithic source areas for Late Archaic artifacts. 0: Gaudreau site. 1: St-François Lake, silicified mudstone. 2: Quebec City, Québec chert (Appalachian). 3 : Témiscouata lake, Touladi chert (Appalachian). 4 : Mount Traveller, rhyolite. 5: Mount Kineo, rhyolite. 6: St. Albans, Hathaway chert (Appalachian). 7: Orwell, Mount Independence chert. 8: Flint Mine hill, Normanskill chert (Appalachian). 9: West Athens hill, Normanskill chert (Appalchian). 10: Lake Erie, Onondaga chert. All distances are approximate direct flight distances calculated with the ruler tool in the Google Earth program.

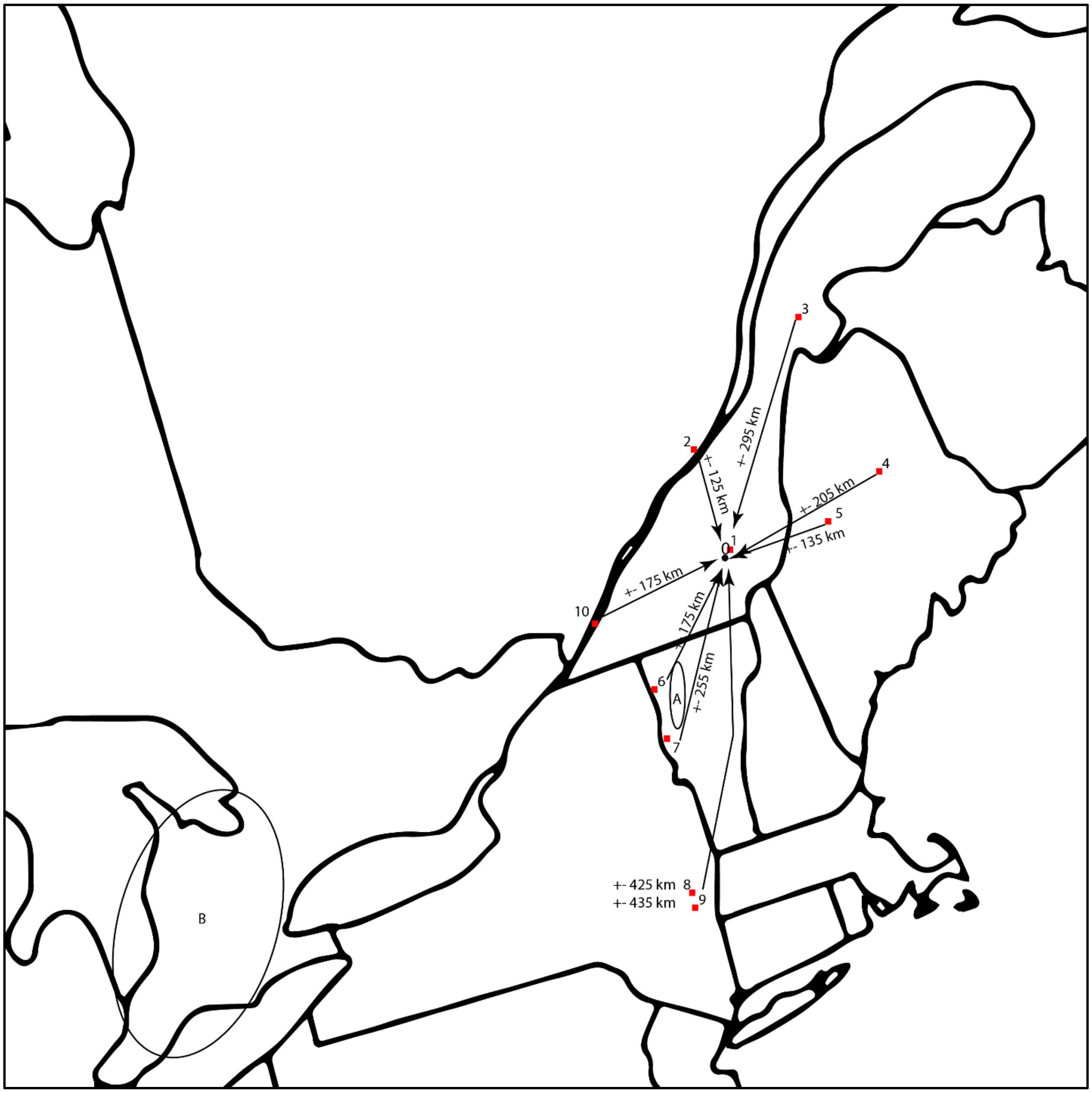

Figure 4.1.2: Lithic source areas for Terminal Archaic artifacts. 0: Gaudreau site. 1: St-François Lake, silicified mudstone. 2: Quebec City, Quebec chert (Appalachian). 3: Témiscouata Lake, Touladi chert (Appalachian). 4: Mount Traveler, rhyolite. 5: Mount Kineo, rhyolite. 6: St. Albans, Hathaway chert (Appalachian). 7: Orwell, Mount Independence chert. 8: Flint Mine Hill, Normanskill chert. 9: West Athens Hill, Normanskill chert. 10: Mount Royal, hornfelsified shale. A: Approximate range of distribution of Cheshire quartzite. B: Approximate range of southern Ontario cherts. All distances are approximate direct flight distances calculated with the ruler tool in the Google Earth program.

Figure 4.1.3: Raw materials of diagnostic artifacts. From left to right: Row A: Objects 346, 911, 1763 & 1965, Kineo-Traveller rhyolite. Row B: Objects 2762 & 2957, Kineo-Traveller rhyolite. Object 2842, Banded spherulitic rhyolite. Object 3084, undetermined chert or rhyolite. Row C: Objects 135, 1711, 3025 & 3091, Appalachian cherts. Row D: Objects 463, 697 & 1976, Mount Independence chert. Object 2152, undetermined chert. Row E: Objects 1426, 1602& 2943, silicified mudstone. Object 599, undetermined chert. Row F: Objects 1237 & 2450, Cheshire quartzite. Object 2572, quartz. Object 544, Hornfelsified shale (weathered). Row G: Object 3080, Selkirk-like chert. Object 3118, Onondaga-like chert.

4.2 Macrotools

4.2.1 Bayonets

Object BkEu-8.1074 is classified as a polished stone bayonet, and appears to have been shaped from a volume of an undetermined sedimentary or metamorphic rock of unknown origin (Figure 4.2.1). This piece is likely to have been rejected following a transverse breakage at the plausible mid-length of the object. Moderate-sized conchoidal removals are present on both faces, and are likely the result of post-depositional processes. The piece presents a quadrangular cross-section, presenting a greater convexity on its internal face. The four faces creating the cross section were abraded at an angle, around 45 degrees for the internal face and around 30 degrees for the external face, with a back-and-forth motion diagonal to the proximal-distal axis. Upon completion of the cross section, a large bevel was abraded on the distal extremity at an angle of around 35 degrees with both a back-and-forth motion on the proximal-distal axis and a circular motion. The piece was then polished through means unknown. Finally, small notches on both edges of the piece were created through grooving, likely with a flake with a back-and-forth motion perpendicular to the planes of the faces of the piece.

Figure 4.2.1: Faces A and B of object BkEu-8.1074.

Object BkEu-8.2380 (Figure 4.2.2) is made of a slightly shaly grey slate of unknown origin. This piece presents an asymmetrical quadrangular cross section. This object has been fragmented into a minimum of four pieces, with only two pieces recovered and refit. The object was likely abraded over all of its surface prior to its fragmentation, but no indicative striations remain. No polishing is evident on the object, and it appears to be weathered. Some scarring is present on the object, though this may be due to post-depositional processes.

Figure 4.2.2: Faces A and B of object BkEu-8.2380.

4.2.2 Semi-Circular knife

An abraded and polished stone semi-circular knife, object BkEu-8.2210, quite similar to the artifact presented in Rice (1979), is present in the assemblage (Figure 4.2.3). It appears to have been made from a light grey banded slate, which seems to present a conchoidal or subconchoidal fracture. The location of origin of this raw material is unknown. The "handle" area of this piece may have been in part shaped through grooving to remove excess material, though no relevant stigmata remain. Most traces of abrasion on the object appear to be post depositional, as are most if not all removals present on its surfaces. However, abrasions present on the bevel on Face A of the object may be the result of resharpening of the object. Apart from these stigmata, this object appears to have been fully polished.

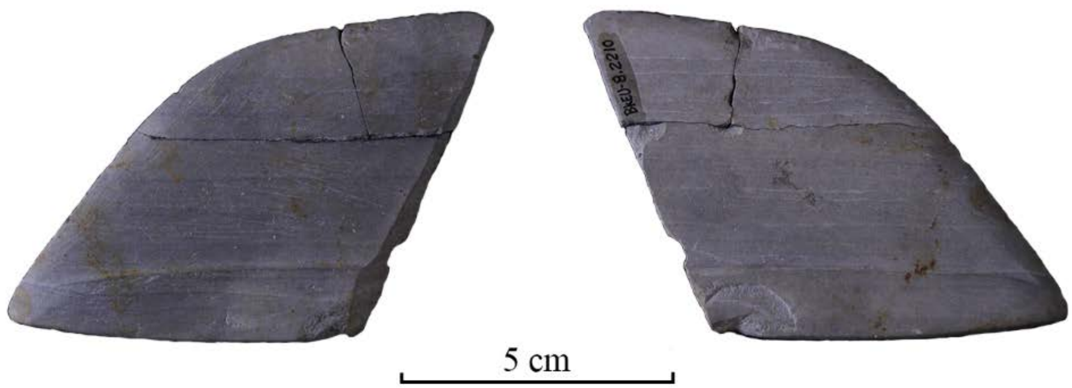

Figure 4.2.3: Faces A and B of object BkEu-8.2210.

4.2.3 Point

An abraded stone "point", object BkEu-8.3119, made from locally derivable grey shale is present in the assemblage (Figures 4.2.4). The raw material is fissile and presents very fine foliations. Direct percussive shaping techniques, such as direct soft or hard hammer percussion, are unlikely to have been used as foliated materials tend to split along their laminations when repeatedly percussed, as the material loses solidarity (author's observations). However, pecking the edges with a flake or a ridged hammerstone to narrow and shape the piece, minimally altering the thickness of the volume of material, is a proper technique for foliated materials as it reduces the risk of material failure(Sanger and Newson 2000). Doing so essentially "chews" the edge until the desired shape and regularity is obtained. Although there are ridged hammerstones made from quartz cobbles present in the assemblage, the lack of relevant stigmata on object BkEu-8.3119 does not demonstrate the use of the aforementioned technique in its shaping, even though it is plausible that said technique may have been used earlier in the operational sequence. Abrasion is present on the entire piece, and have erased all prior stigmata. Visible parts of the sequence are indicative of a conception of producing the shape then finalizing the volume. The edges were abraded perpendicularly to the primary faces of the piece to create the outline. The faces of the piece were then abraded perpendicularly or diagonally to the long axis of the piece, with what appears to be a back-and-forth motion. As for the bevels, they were abraded perpendicularly to the length axis of the piece, angular to the plane of the face from which they are shaped. Sandstone abraders are present in the collection, and appear to be likely candidates to have been used to abrade the piece, though traceology would be necessary to demonstrate their use (both as abraders and for the abrasion of the shale).

Figure 4.2.4: Faces A and B of object BkEu-8.3119.

4.2.4 Rod

Object BkEu-8.2524 (Figure 4.2.5) appears to be a polished stone rod made of a fine sandstone or siltstone of unknown origin, though similar materials are locally available. The use of this material is surprising, as it would be expected that a foliated stone would have been utilized. As result, it is to be assumed that the sequence to produce this object is likely different, at least in terms of percussive techniques used (i.e. no use of a ridged hammerstone for pecking), from the sequence proposed by Sanger, et al. (2001). The object has been heavily fragmented, and some differential weathering is evident in areas presenting removals or scarring. The object may have been shaped through abrasion, though it cannot be confirmed as abrasion may simply have been used to regularize the surfaces of the piece. The object has a very uneven shape, with its thickness varying greatly along its length.

Figure 4.2.5: Faces A and B of object BkEu-8.2524.

4.2.5 Gouge

An uncatalogued short-channeled gouge was identified in the assemblage (Figure 4.2.6). It appears to have been made of an undetermined metamorphic rock of unknown origin. Face B of the piece has been fully abraded, whereas Face A of the piece and the left edge remain partly rough and unequal. The active section/distal extremity of the piece has been polished on both faces. Flake removals are present at the proximal edge of Face B. Should these removals be unrelated to the production of the piece, they would be indicative of a mode of functioning wherein the distal extremity would be placed against a surface to be worked, likely at an angle, and then the proximal section would be struck with another object, such as a hammerstone. Proper traceological analysis would be necessary to demonstrate that the piece was used as such.

Figure 4.2.6: Faces A and B of the uncatalogued gouge.

4.3 Bifaces

4.3.1 Late Archaic bifaces

Brewerton bifaces

Four bifaces are identified as being Brewerton (Figure 4.3.1). Three of the bifaces are made of undetermined cherts, whereas the remaining biface is made of a rhyolite bearing resemblance to the Kineo-Traveller rhyolite (BkEu-8.1965). Neither of the four bifaces has retained its barbs, so they are all classified as the side notched variant, though three appear to display notches that may have been worked in a manner to produce corner notches.

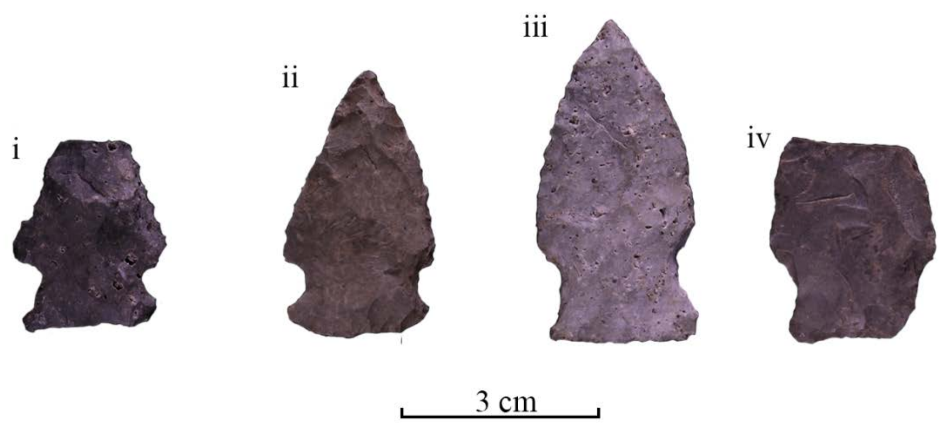

Figure 4.3.1: Bifaces identified as of being the Brewerton type. I) BkEu-8.463. II) BkEu-8.1711. III) BkEu-8.1965. IV) BkEu-8.3118.

Object BkEu-8.463 (Figures 4.3.2 and 4.3.3) is made of an altered dark grey chert of an undetermined source, but bearing similarities to the Mount Independence chert. The piece is relatively thick, with an uneven biconvex cross-section. The piece appears to have been shaped from both lateral edges and from the proximal edge. No covering removals are visible, nor are any invasive removals. A large step termination was produced by a removal initiated from the proximal portion of the lateral edge, oriented diagonally, during the shaping of the piece. Retouch of the hafting section was executed with short non-consecutive removals, starting along the ridges left by removals created during the shaping phase. The notches were created through removals initiated on both faces, with some being relatively large. Resharpening is present along the full length of the edge of the active section on both faces, with removals initiated in a non-consecutive fashion. Removals are relatively abrupt, with some being quite short. A slight double-beveled profile is visible when observed from the distal portion.

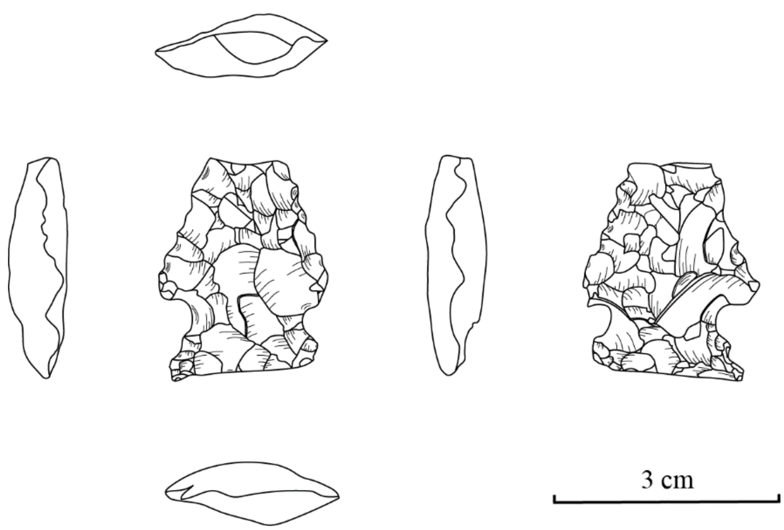

Figure 4.3.2: Drawing of object BkEu-8.463.

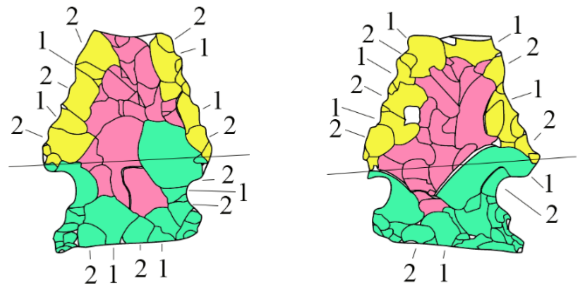

Figure 4.3.3: Diacritical scheme of object BkEu-8.463. Pink: Shaping. Teal: Retouch. Gold: Resharpening.

Object BkEu-8.1711 (Figures 4.3.4 and 4.3.5) is made of a matte greyish-grey chert with affinities (texture, matrix, grain) to Appalachian cherts. This object displays a biconvex cross-section, though its faces are relatively planar near their center. Covering removals originating from both the lateral edges and the proximal edge blanket the center of the piece, all having been produced during the shaping of the piece. On Face A the removal from the proximal edge is posterior to the lateral removals, whereas the opposite was done on Face B. Some minor step terminations were created during the shaping phase. Retouch of the hafting section is generally semi-abrupt and non-consecutive, though a group of consecutive removals is present on face A. Removals done during the retouch phase appear to be generally independent of ridges created during shaping, though said ridges may simply have been completely obliterated during retouching. The notches were created through short and abrupt removals on both faces. Removals resulting from resharpening are present on the near entirety of the active section's edge on both faces. The removals are non-consecutive in general and tend to be steeper near the shoulder. Removals attributed to resharpening appear to be independent of the ridges created during shaping. An effort appears to have been made to maintain the lateral symmetry of the piece. Some step terminations near the edges of the piece appear to have been created throughout the resharpening of the piece.

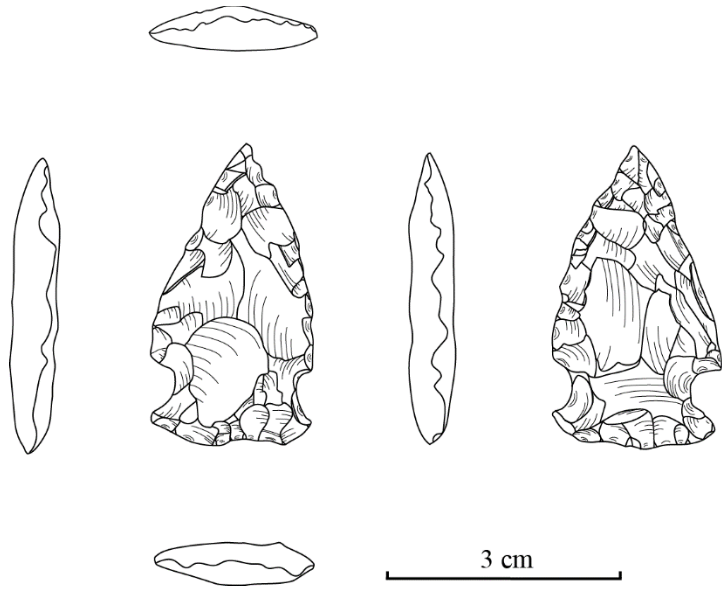

Figure 4.3.4: Drawing of object BkEu-8.1711.

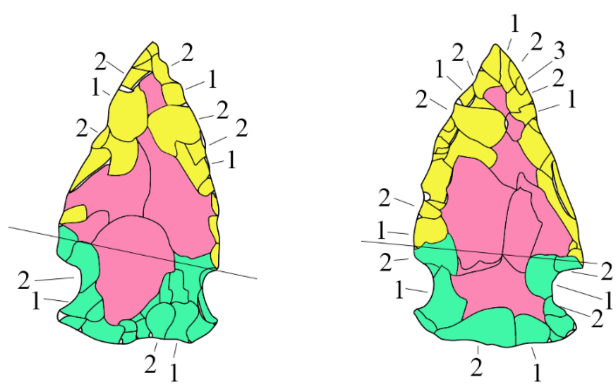

Figure 4.3.5: Diacritical scheme of object BkEu-8.1711.

Object BkEu-8.1965 (Figures 4.3.6 and 4.3.7) is made of an altered rhyolite bearing resemblance to the Kineo-Traveller rhyolite. The piece is wide and thin, and displays a symmetrical lenticular cross-section. Though no clear line of convergence is present on Face A, a sinuous but center line of convergence is visible on Face B. Shaping on both faces of the piece was done through removals initiated from the lateral and proximal edges. The two faces of the piece present different patterns of removals, with Face A presenting invasive and covering removals generally oriented towards the opposing edge, whereas Face B presents shorter removals converging towards the center of the piece. Some minor step terminations are also present on face B. Retouch of the hafting section was done with non-consecutive removals along ridges created during shaping. Flakes were removed on Face B to contract the proximal area prior to the completion of the notches, which were created by steep unifacial removals on Face A. Resharpening on the active section of the piece exploits the ridges left by previous removals on both faces in both non-consecutive and consecutive fashion. Removals are more abrupt from the distal third of the piece to the distal extremity. Lateral symmetry appears to have been maintained on the piece throughout its resharpening.

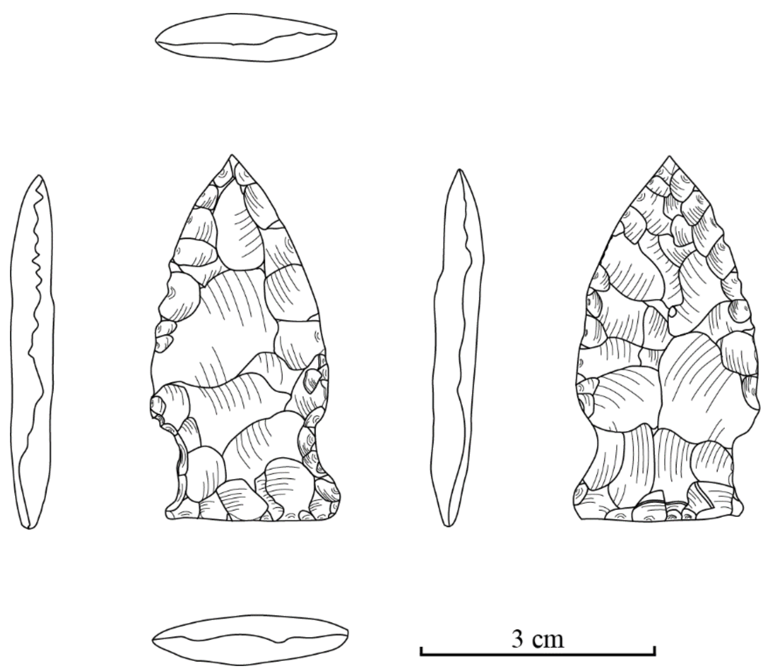

Figure 4.3.6: Drawing of object BkEu-8.1965.

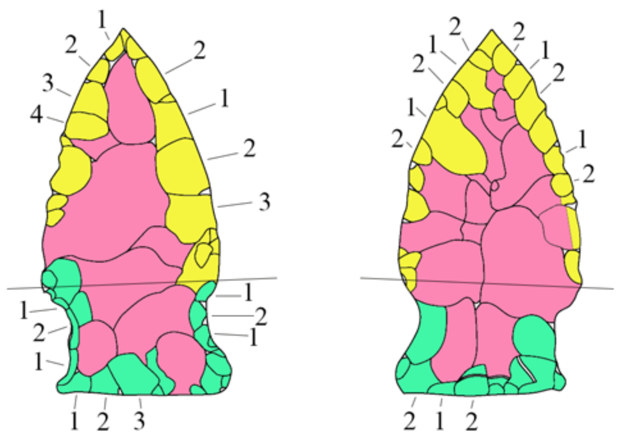

Figure 4.3.7: Diacritical scheme of object BkEu-8.1965.

Object BkEu-8.3118 (Figures 4.3.8 and 4.3.9) is made of a beige-ish dark grey chert with slight mottling, with affinities to some variants of Onondaga chert or similar cherts. This object presents a biconvex cross-section that is near lenticular. Covering removals produced during shaping emanate from both lateral edges and the proximal edge. A covering removal on Face B covers nearly half of the surface of the removals maintained following the shaping phase. This results in a convergent pattern on Face B, whereas a centripetal pattern is visible on Face A. On both faces, removals originating from the proximal edge are posterior to the removals originating from the lateral edges. Retouch of the hafting section was executed mainly through small non-consecutive removals on Face A, whereas consecutive and non-consecutive removals were utilized on Face B. Most removals appear to be independent of the ridges created during shaping, with ridges created during retouch being preferred. The proximal edge of the piece is asymmetrical, with the right edge presenting steep retouch. A large portion of the edge of the active section presents removals attributed to resharpening, with Face B presenting the most removals. As with the retouch phase, the removals are generally independent from the ridges left by the shaping phase. Removals on Face A are non-consecutive, whereas removals on Face B are consecutive. Resharpening on this piece is both bifacial and nearly symmetrical.

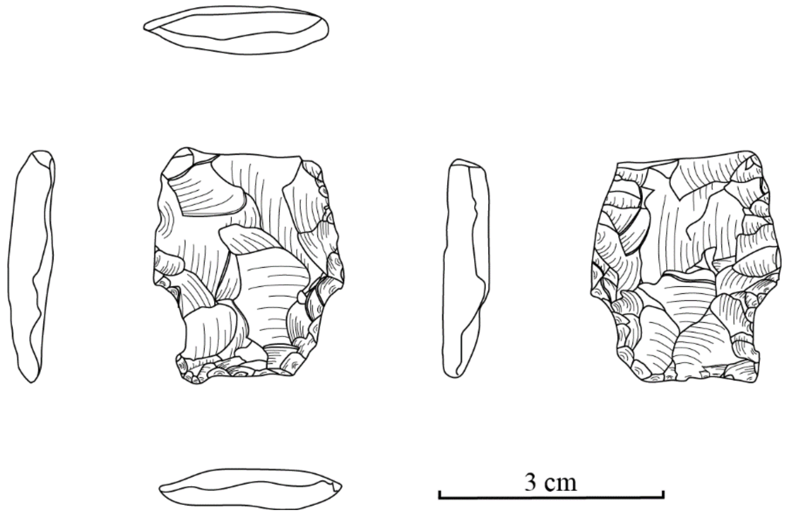

Figure 4.3.8: Drawing of object BkEu-8.3118.

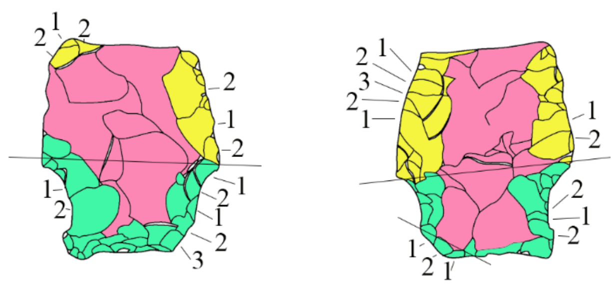

Figure 4.3.9: Diacritical scheme of object BkEu-8.3118

Though all bifaces of this type are made of different materials from different areas of provenience, commonalities are still present in their operational sequences (Figure 4.3.10). The most common technical element of the sequences is that shaping is undertaken from three edges among all bifaces. This is likely due to that the project requires the biface to be relatively broad near its proximal section. Shaping from the proximal edge therefore is to compensate for the increased width of the biface. Three of the bifaces (1711, 1965, and 3118) present thin and roughly regular biconvex or lenticular profiles, and are also the same three presenting covering removals on what remains of the evidence of their shaping. Large removals allow the knapper to more easily create a regular profile, albeit with a loss of convexity. The only biface not presenting these large removals, BkEu-8.463, is also the only biface to present a thick biconvex profile. The ordering and orientation of the final removals from the lateral and proximal edges is likely both an individual and non-conscious result, in that it is a reactive choice to the remaining thicknesses or irregularities prior to the retouching of the piece. The refitting of flakes would be necessary to determine if these final choices of removals are part of a consistent ordering technique by the knapper or simply the hypothesis presented above. Object BkEu-8.1965 does differentiate itself from the other bifaces by what appears to be a contraction of its proximal section during the final moments of its shaping, prior to retouch, likely to facilitate its notching. Oddly enough, whereas it would be expected that it would be this piece that would present the most salient step terminations, as Kineo-Traveller rhyolite is well known amongst modern flintknappers as a difficult material[8], it is actually object BkEu-8.463 that presents major step terminations.

During retouch, objects begin to be individualized to a greater degree. Object BkEu-8.463 remains relatively individualized through its choices, whereas as objects BkEu-8.1711, 1965, and 3118 begin ungrouping themselves, mainly through notching removal placement and face selection and the use of semi-abrupt removals to form the hafting section. This individualization continues into the resharpening of the active sections, wherein objects BkEu-8.1711 and 1965 further differentiate themselves, occasionally converging with object BkEu-8.463.

[8] The difficulty of this material is due to the force necessary to remove flakes. The phenocrysts that are visible macroscopically do not appear to have an effect *de visu* during flake removal (Author's notes, 2015).

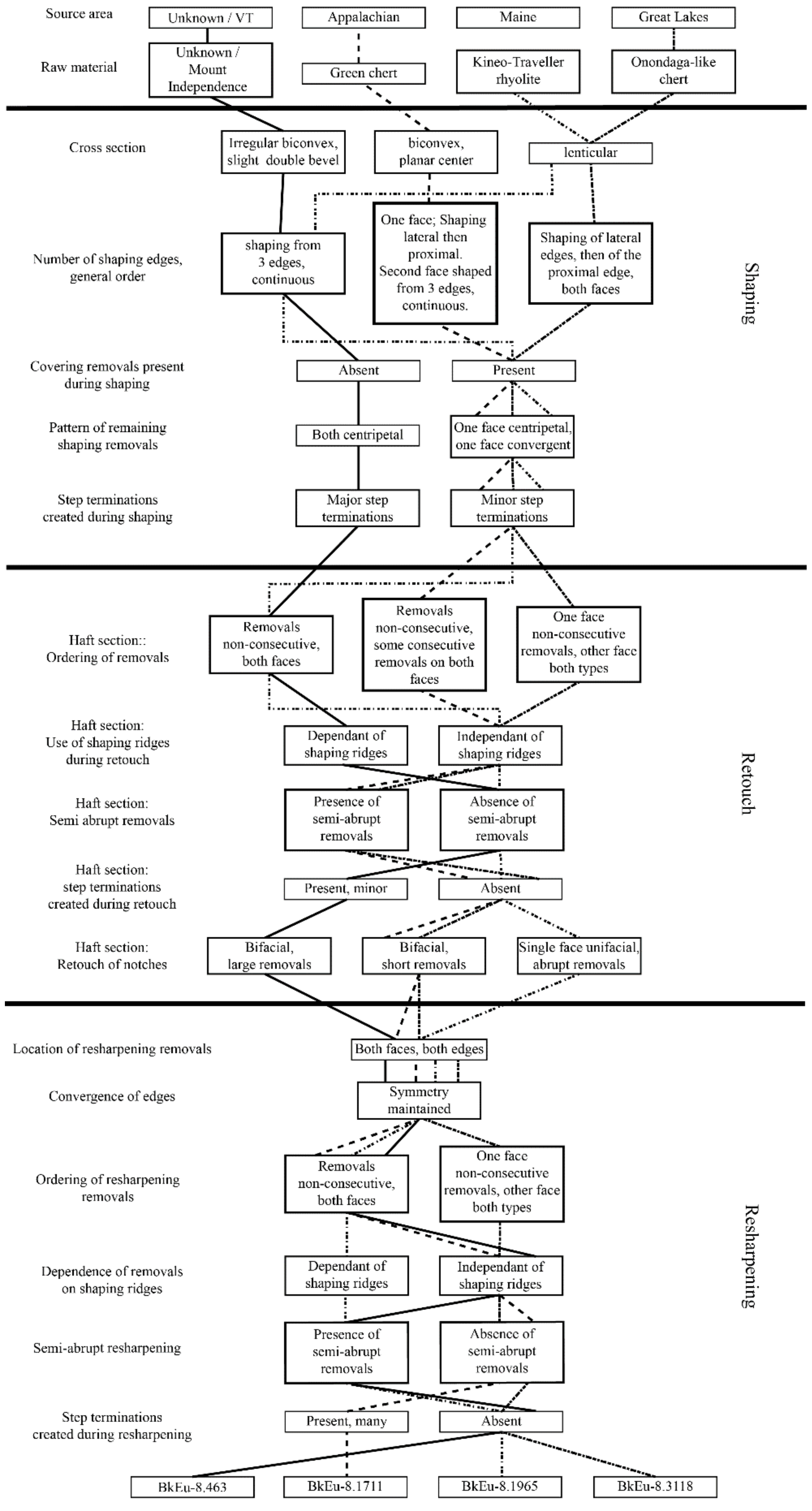

Figure 4.3.10: Sequence of choices and errors on Brewerton bifaces[ii]

Vosburg biface

A single biface of this type was identified (BkEu-8.2943), made of what appears to be a variant of the locally available red silicified mudstone presenting small layers of quartz veins (Figures 4.3.11, 4.3.12 and 4.3.13). This piece presents a plano-convex cross section, with this convex face displaying a lump created by an accumulation of removals ending with step terminations. The cross-section is therefore likely the result of the inability of the knapper to readjust the placement and angle of the edges. The piece was shaped with removals initiated from both lateral edges and from the proximal edge. Whereas many uncorrected step terminations are present on Face A, Face B presents both fewer step fractures and more even removals. This results in a clearer centripetal pattern on Face B. Retouch of the hafting section was accomplished through short non-consecutive removals that generally do not exploit ridges left by the shaping phase. The left notch was formed by single large removals on both faces, whereas the right notch was formed by multiple non-consecutive removals on both faces. The piece is bifacially resharpened in a symmetrical manner. Barbs on the piece have been partially obliterated by resharpening events. Removals attributed to resharpening are non-consecutive and generally short. When possible, ridges formed during the shaping phase are exploited to resharpen the piece.

Figure 4.3.11: Face A of object BkEu-8.2943.

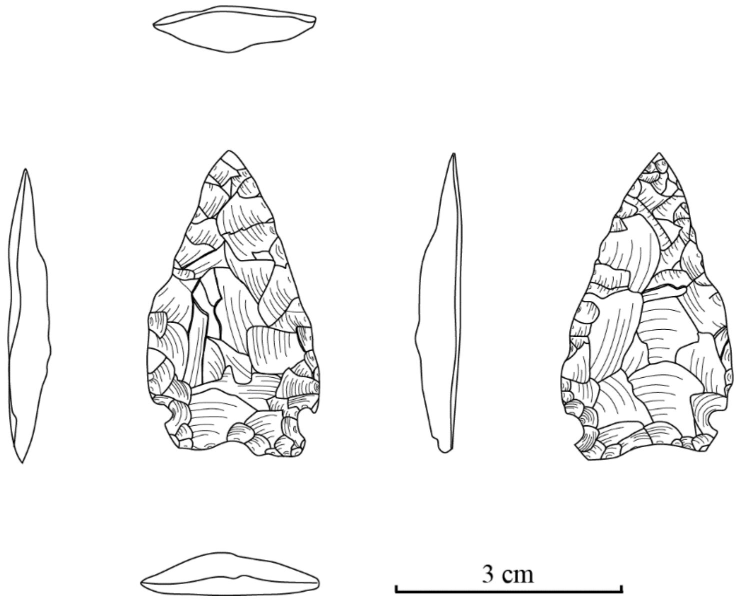

Figure 4.3.12: Drawing of object BkEu-8.2943.

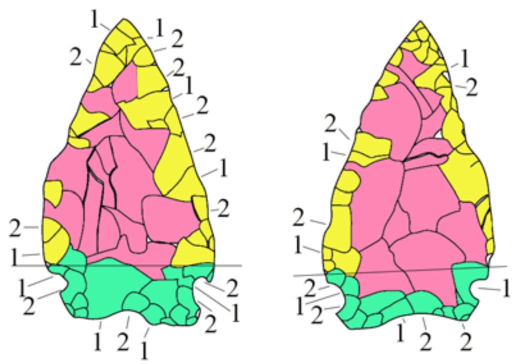

Figure 4.3.13: Diacritical scheme of object BkEu-8.2943.

4.3.2 Terminal Archaic bifaces

Lamoka bifaces

Five bifaces are identified as being of the Lamoka type (Figure 4.3.14). Both subtypes, contracting stemmed and expanding stemmed, are present in the assemblage. Of the five, three present contracting stems, whereas the remaining two present expanding stems. No bifaces of this type present a retained striking platform, and of the five only one (BkEu-8.3080) presents cortex on its stem.

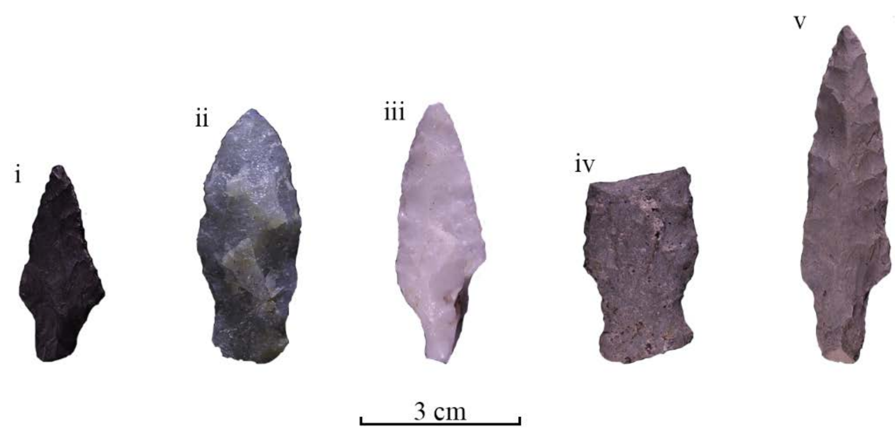

Figure 4.3.14: Bifaces identified as being of the Lamoka type. I) BkEu-8.135. II) BkEu-8.1237. III) BkEu-8.2572. IV) BkEu-8.1763. V) BkEu-8.3080.

Object BkEu-8.135 (Figures 4.3.15 and 4.3.16) is made of a matte black chert of unknown origin, though it may be a black colored variant of an Appalachian chert. The piece presents a plano-convex cross section, though its longitudinal section is heavily curved towards Face A and its base is significantly thicker than the rest of the piece. What little remains of the removals produced during shaping seem to indicate a very well centered line of convergence of removals initiated exclusively from the lateral edges. Retouch of the hafting section of the piece was achieved through small semi-abrupt non-consecutive removals. Resharpening of the active section was executed through small and relatively large non-consecutive removals along most of the edge, all while maintaining lateral symmetry.

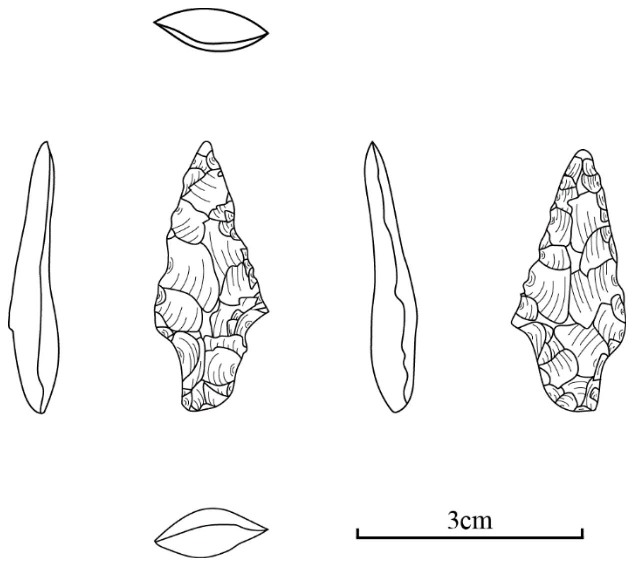

Figure 4.3.15: Drawing of object BkEu-8.135.

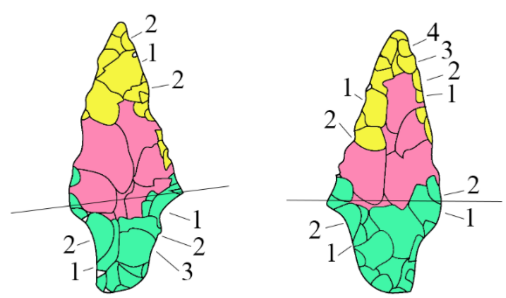

Figure 4.3.16: Diacritical scheme of object BkEu-8.135.

Object BkEu-8.1237 (Figures 4.3.17 and 4.3.18) is made of a quartzite bearing resemblance to the Cheshire quartzite, originating in the present day state of Vermont. This piece presents a bimodal cross section: The piece presents two plano-convex cross sections, one for the active section with the convex face being Face A, whereas the second convex area is present on the hafting section of Face B. The convexity on Face A is a mass presenting multiple step terminations.

Multiple attempts at removing the mass appear to have been made, culminating in two covering removals that were unable to clear the mass. Shaping of the piece was executed through removals initiated from both lateral edges, exploiting ridges left by previous removals. Retouch on the piece is limited to the hafting section and to the distal extremity of the active section. Removals initiated at this phase appear to be non-consecutive and independent of ridges left by removals created during shaping. This object does not appear to have been resharpened. Though the piece can be associated with the Lamoka-like type, its form and the prevalence of mistakes on its faces may indicate that the piece was obtained in a less terminal form, such as a blank or lesser shaped biface, with its rejection being the result of a failure to properly shape the piece on site.

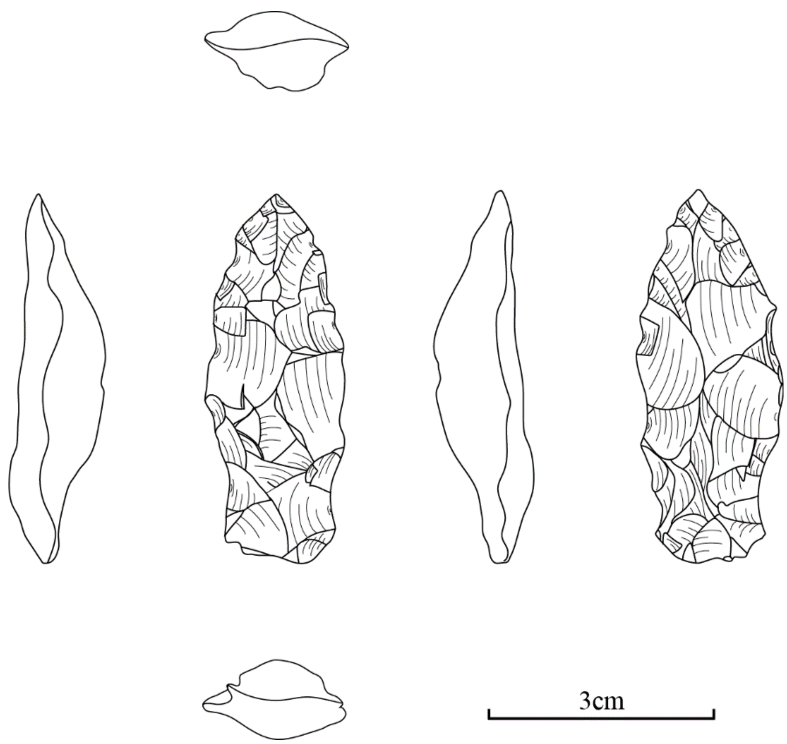

Figure 4.3.17: Drawing of object BkEu-8.1237.

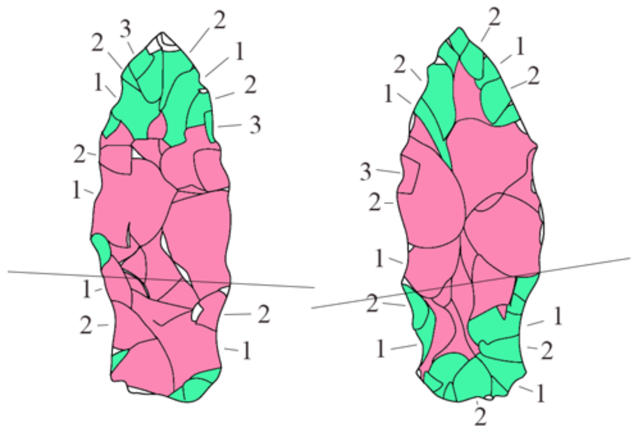

Figure 4.3.18: Diacritical scheme of object BkEu-8.1237.

Object BkEu-8.1763 (Figures 4.3.19 and 4.3.20) is made of a weathered rhyolite bearing resemblance to the Kineo-Traveller rhyolite. A large area on Face A of the piece presents removals that are unreadable. This object presents an irregular biconvex cross section, with what appears to be lumping on both faces of the piece. The shaping of this piece was executed through removals initiated along both lateral edges in a non-consecutive fashion, consistently exploiting ridges left by prior removals. Step terminations created during shaping are very numerous on both faces, with some being severe to the point of significantly affecting the cross section of the piece. Retouch is relatively limited on this piece. The hafting element of the piece was retouched mainly through short non-consecutive removals, though larger removals exploiting prior removals are present. The stem was contracted through short removals on both faces, with repeated failure resulting in the blunting of the edge of the stem. Retouch on the active section is limited to a few short removals along the ridges produced by removals initiated during shaping.

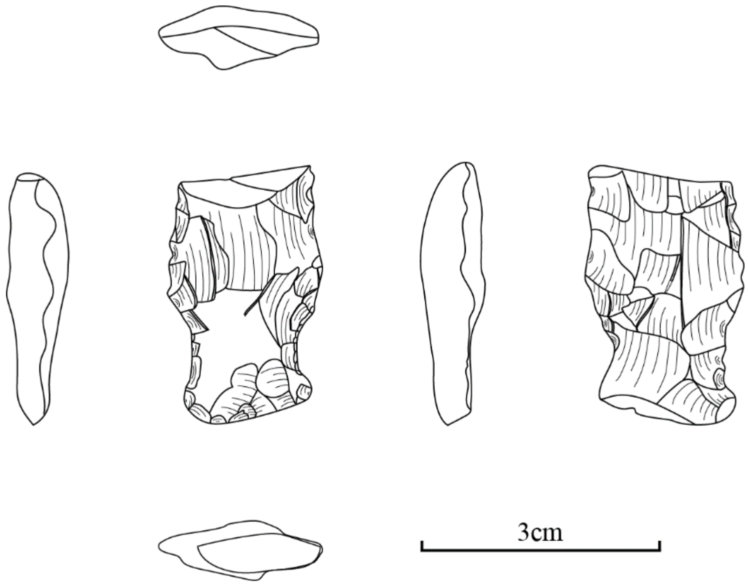

Figure 4.3.19: Drawing of object BkEu-8.1763.

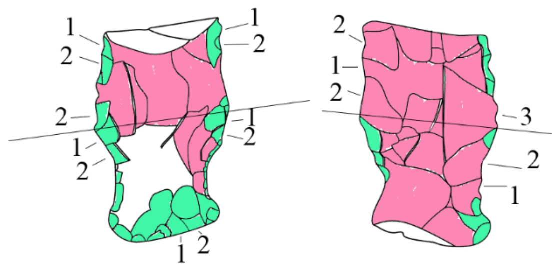

Figure 4.3.20: Diacritical scheme of object BkEu-8.1763.

Object BkEu-8.2572 (Figures 4.3.21 and 4.3.22) is made of a fine milky quartz, a material most likely available and abundant in the immediate environment of the site. The piece displays a quadrangular cross-section, with lumping present on both of its faces. Shaping of the piece was executed through removals initiated along the lateral edges of the piece, though there appears to have been removals initiated perpendicularly to the shaping planes from the proximal edge. Removals attributed to the shaping phase are generally more abrupt along the medial and proximal sections of the piece. Retouch on this piece seems to be limited to small removals along the edges of the active section, with the distal extremity presenting the most of these removals.

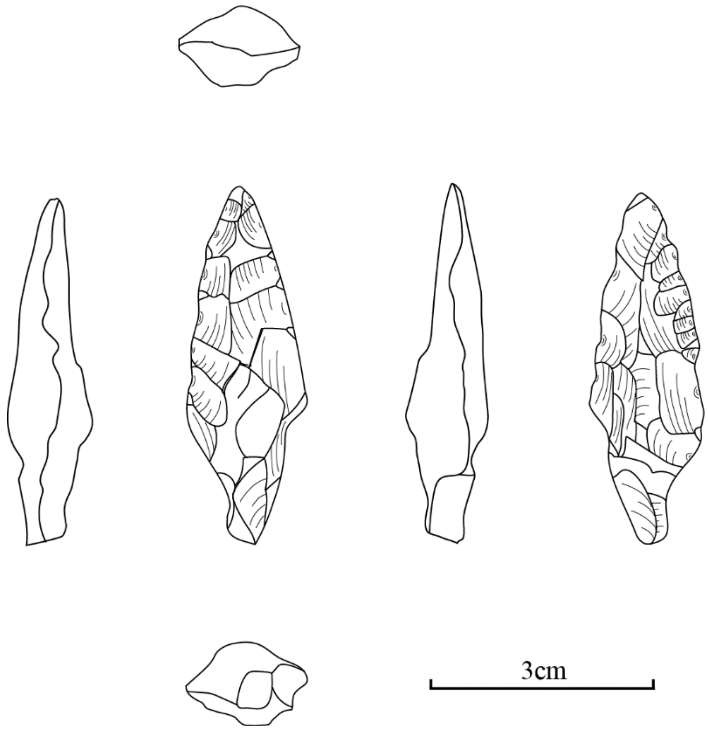

Figure 4.3.21: Drawing of object BkEu-8.2572.

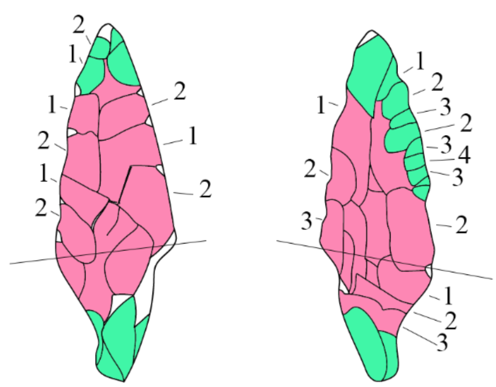

Figure 4.3.22: Diacritical scheme of object BkEu-8.2572.

Object BkEu-8.3080 (Figures 4.3.23 and 4.3.24) is made of a mottled light grey chert, with affinities to the Selkirk chert and other Great Lakes cherts[iii]. The piece displays a well pronounced plano-convex cross section and displays remnants of the cortex of the blank utilized to produce it on its convex face. Face A is likely the external face of the blank. However, the angle of the cortical surface in relation to the axis of the piece may indicate that the cortical surface may in fact be a remnant of the blank's striking platform. In that case, Face B would be the external face, and may have been relatively plane prior to shaping. Shaping removals on Face A are semi-abrupt, non-consecutive, and generally do not reach beyond the central longitudinal axis of the piece. Removals initiated during shaping on Face B tend to have flatter profiles, occasionally surpass the central longitudinal axis, and are non-consecutive. All removals during shaping were initiated along the lateral edges of the piece. The individual who produced this piece appears to have either voluntarily maintained the volumetrics of the blank throughout the shaping of the piece or may have failed to readjust the placement and angle of the edge as to create a symmetry of faces. Retouch of the hafting section of the piece was done through short non-consecutive removals independent of the ridges left by shaping, all while avoiding the complete removal of the external face's cortex. Some retouch is still visible on the active section of the piece, and generally exploits ridges left by the shaping phase. Some resharpening is visible at the distal extremity of the piece, and is characterized by non-consecutive removals and the maintenance of lateral symmetry. Some minor step fractures were produced during all phases of the creation of the piece.

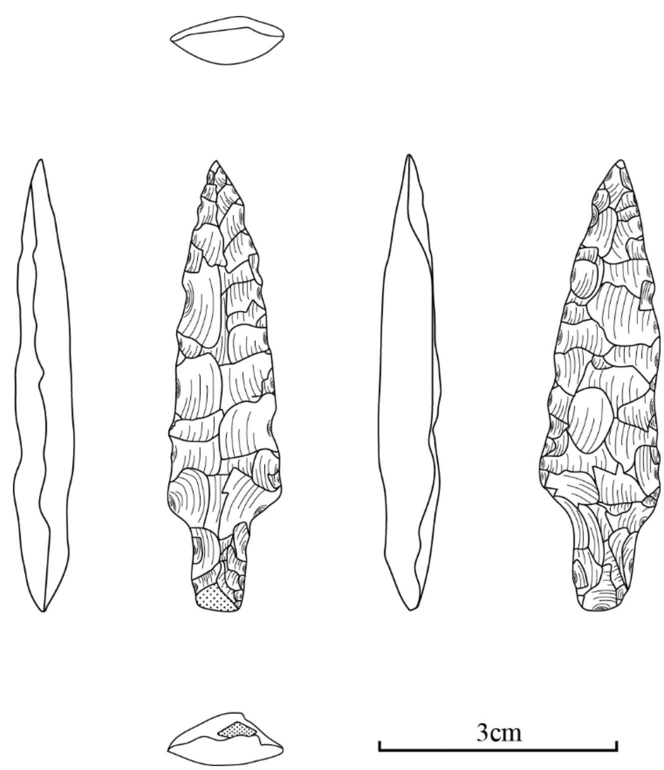

Figure 4.3.23: Drawing of object BkEu-8.3080.

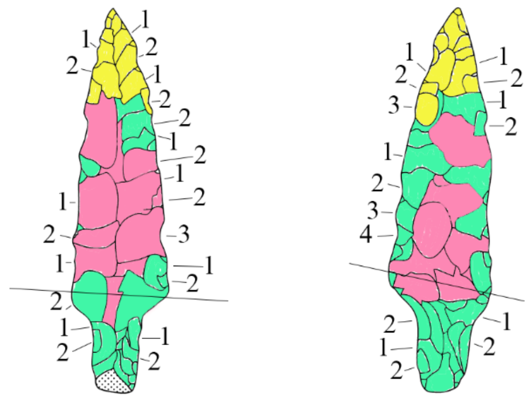

Figure 4.3.24: Diacritical scheme of object BkEu-8.3080.

The presence of both variants of the Lamoka-like type creates a first fork in the sequences (Figure 4.3.25). The inclusion of both sub-variants induces part of the variation in the shaping of the pieces, wherein there is little variation within the subtypes, with some variation limited to one sub-type. As such, covering removals are only present among the expanding base bifaces. In the same manner, semi-abrupt removals during shaping are only present among contracting base bifaces. These latter removals have a noticeable effect on the cross-section of pieces, wherein pieces presenting these removals display plano-convex or quadrangular cross sections. The desired narrowness may be in part responsible for the accumulated choices resulting in these semi-abrupt removals. The relative absence of invasive removals may also be accountable to this narrowness combined with the relatively important thickness of the bifaces. Similar cohesion is also apparent in the retouch of the hafting section, wherein choices tend to remain similar among bifaces of the same subtype. However, in regards to resharpening as distinguishing the different technical groupings could not always be achieved. It is likely that most observable removals present on objects BkEu-8.135, BkEu-8.2572 and BkEu-8.3080 may have been the result of pressure flaking as similar removal patterns and characteristics can easily be reproduced with this technique on relatively narrow bifaces (Author’s notes, 2015).

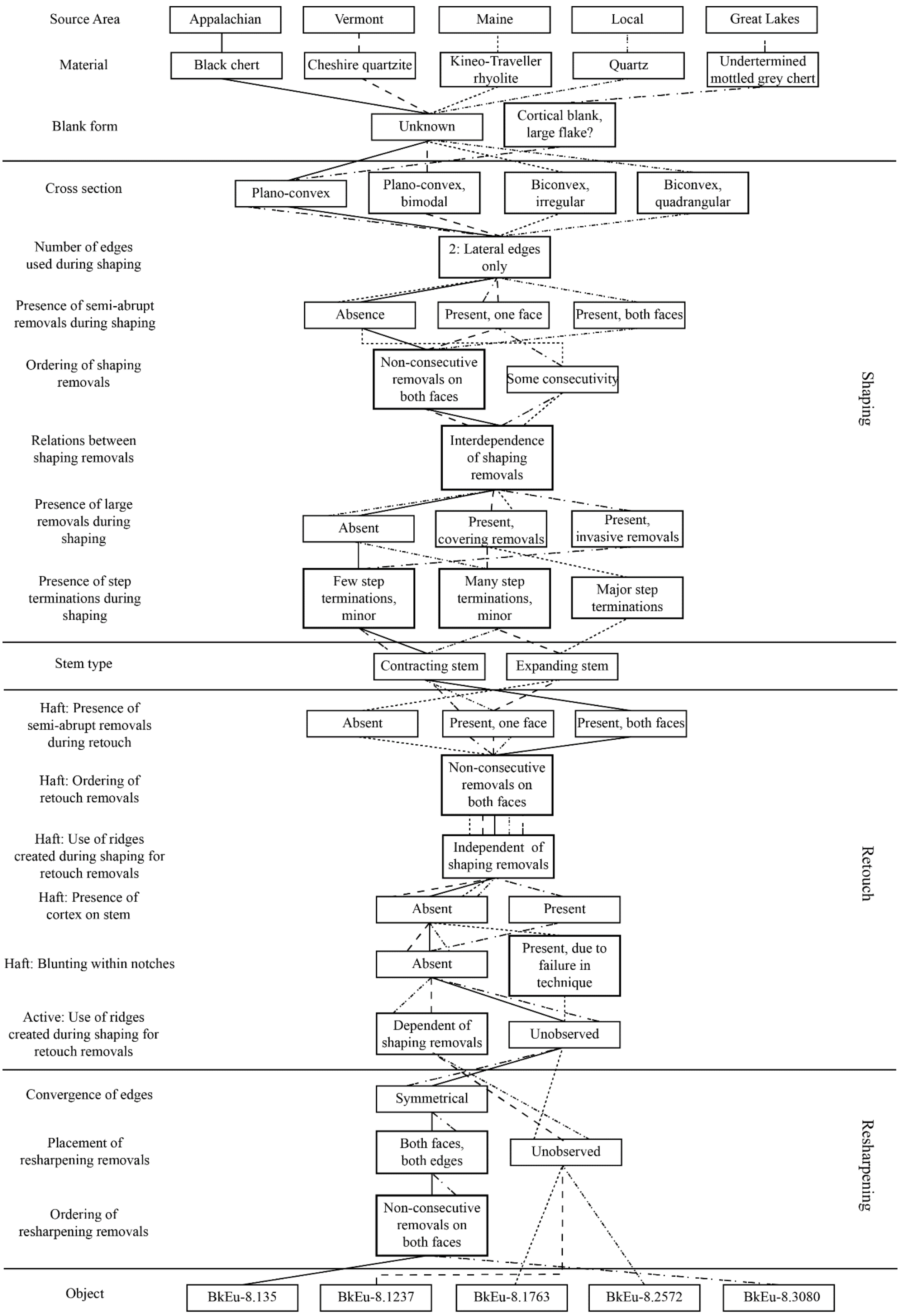

Figure 4.3.25: Sequence of choices and mistakes present among Lamoka bifaces

Normanskill bifaces

Eight bifaces are identified as being of the Normanskill type (Figure 4.3.26), though such a classification may be considered pigeonholing to a certain degree in this instance due to the great variability of the objects placed in this unit. Of these, one have been shaped from the locally available red silicified mudstone (BkEu-8.1602), two others have been shaped from a rhyolite bearing resemblance to the Kineo-Traveller rhyolite (BkEu-8.346 and BkEu-8.911), with the remainder being made of various cherts and quartzites from the Northeast.

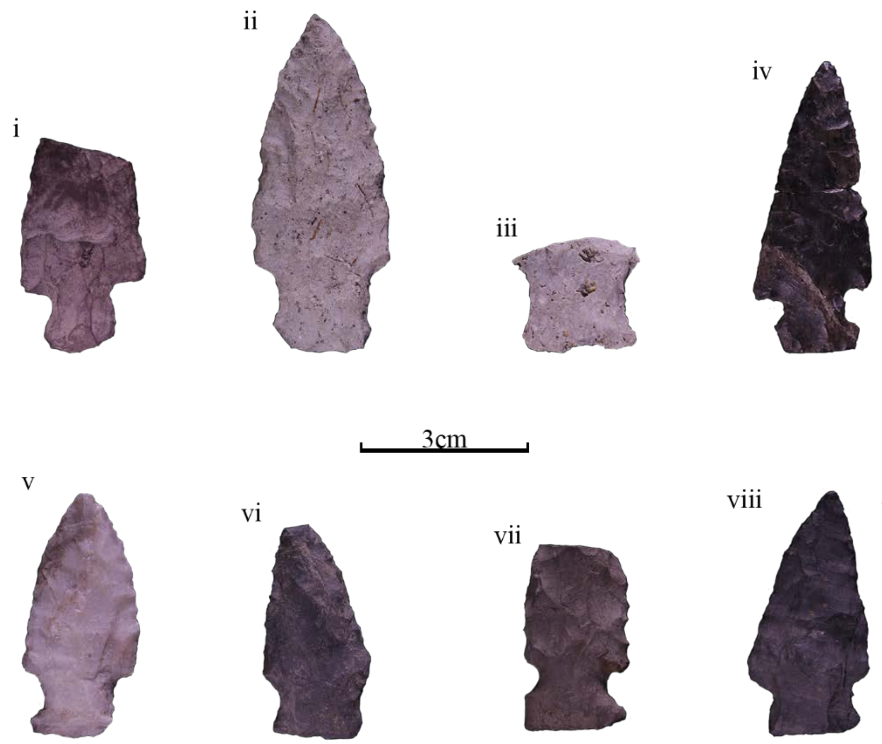

Figure 4.3.26: Bifaces identified as being of the Normanskill type. I) BkEu-8.1602. II) BkEu-8.346. III) BkEu-8.911. IV) BkEu-8.697 and BkEu-8.1707. V) BkEu-8.2450. VI) BkEu-8.2152. VII) BkEu-8.3091. VIII) BkEu-8.1426.

Object BkEu-8.1602 (Figures 4.3.27 and 4.3.28) is relatively thin and flat, though it still presents a biconvex cross section. Removals on the piece tend to have insignificant counter-bulbs and are mostly flat. This peculiarity may be due to less than proper mechanical properties within the material. However, experimentation with the local red silicified mudstone would be necessary to determine whether or not this is truly the case. The piece is shaped from both lateral edges, with multiple covering removals. Most step fractures were created during the shaping of the piece. Retouch on the active section is relatively unimportant, generally only present on one lateral edge of each face. All retouch on this section was done by exploiting ridges formed by prior removals, to the point of obliterating the ridges, all the while without creating long series of removals. The hafting section was retouched in a similar fashion, wherein only one edge per face presents retouch, though some removals on face B appear to have been initiated without the exploitation of a ridge. This piece does not appear to present resharpening.

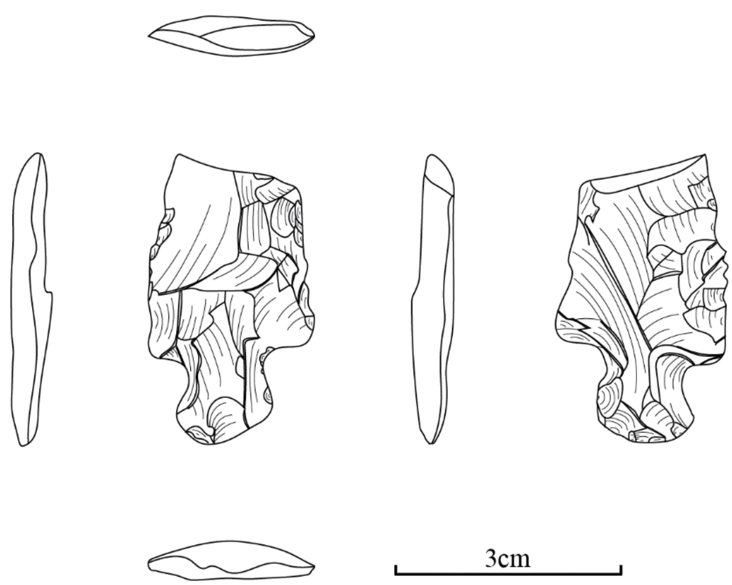

Figure 4.3.27: Drawing of object BkEu-8.1602.

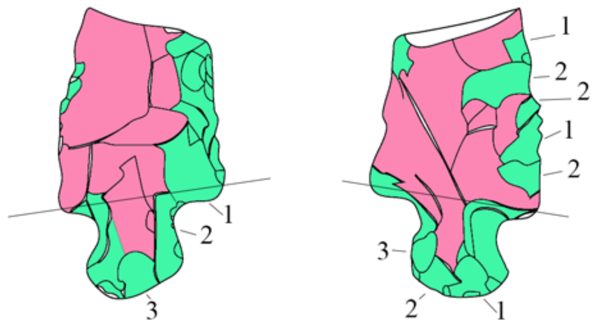

Figure 4.3.28: Diacritical scheme of object BkEu-8.1602

Two Normanskill bifaces made of a rhyolite bearing resemblance to the Kineo-Traveller rhyolite are present in the assemblage: BkEu-8.346 and BkEu-8.911 (Figures 4.3.29 and 4.3.30 for the former, figures 4.3.31 and 4.3.32 for the latter). Similarities may have been greater preceding the breakage and subsequent loss of the active section of 8.911. Both are essentially identical in terms of hafting section, as both are nearly the same size and present same observable choices on hafting section, wherein short flakes are removed to shape the notches and to center the edge. Both were shaped along two edges, though 8.346 does appear to have been shaped from its basal edge (oriented distally). Both also present a lenticular cross-section. Object 8.346 presents some invasive flakes on its active section, but also presents many step fractures created during its shaping. Retouch on the active section follows the same pattern as the hafting section, in that the removals are relatively short, although many terminate with step fractures as opposed to the hafting section. Some resharpening seems to have been executed at the distal extremity of the active section. Previous ridges appear to have been exploited, though non-exclusively, in a non-consecutive manner on both faces, all while maintaining horizontal symmetry at the point of convergence. The tip of the piece is not centered on the thickness axis and is oriented towards face B.

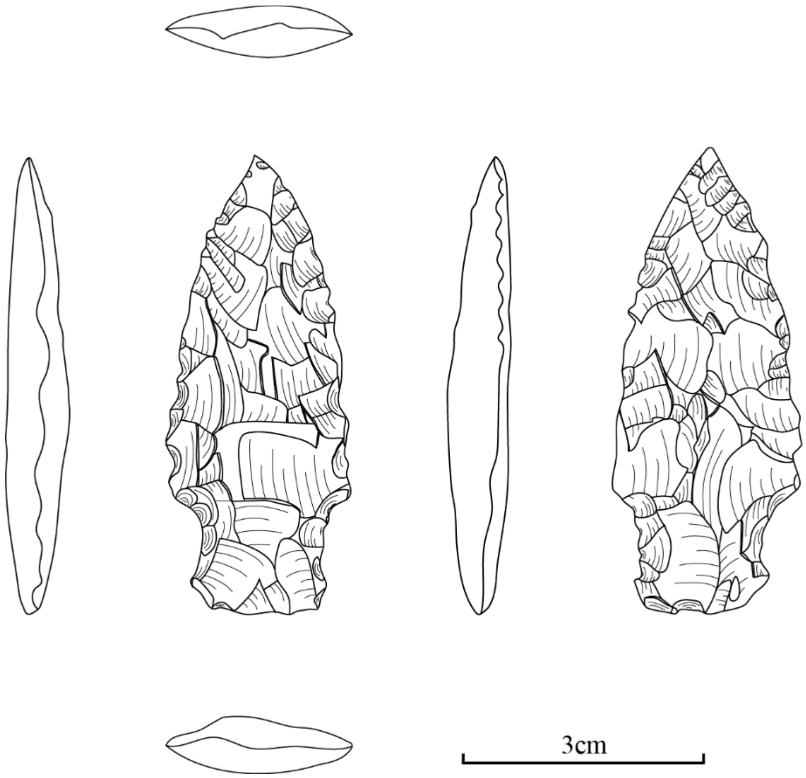

Figure 4.3.29: Drawing of object BkEu-8.346.

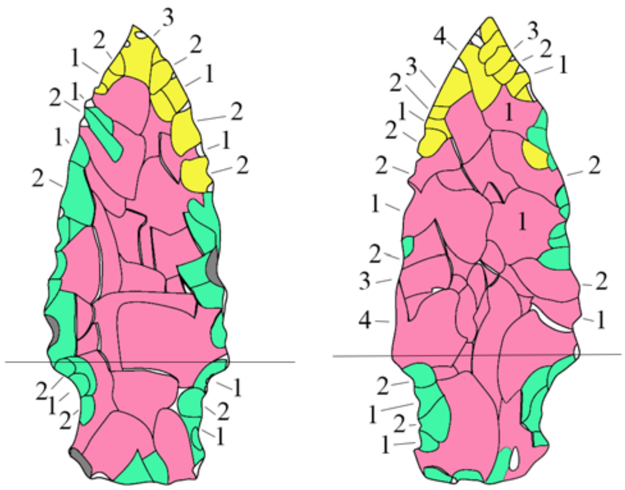

Figure 4.3.30: Diacritical scheme of object BkEu-8.346

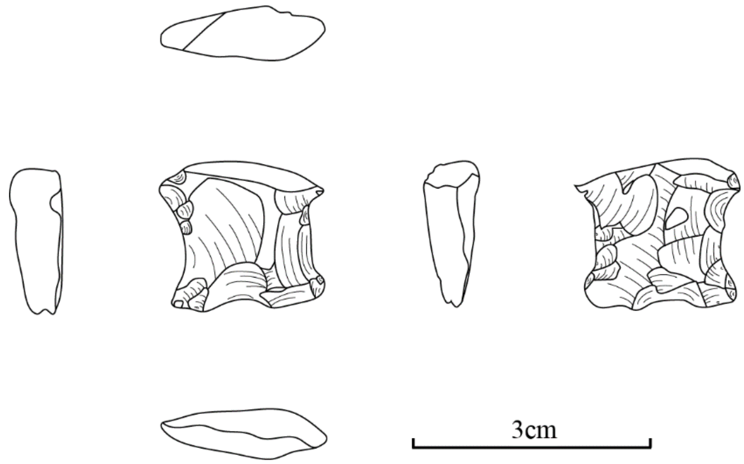

Figure 4.3.31: Drawing of object BkEu-8.911.

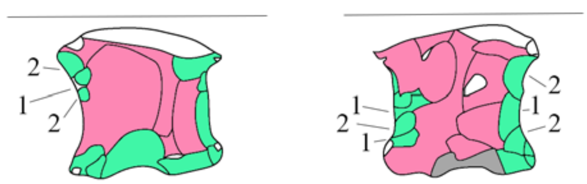

Figure 4.3.32: Diacritical scheme of object BkEu-8.911.

Objects BkEu-8.1707 and BkEu-8.697 are a refitted biface made of an altered semi-translucent dark grey chert, sharing affinities with some variants of Mount Independence chert (Figures 4.3.33 and 4.3.34). At first glance this pieces appears to be the biface of this type produced with the greatest proficiency, due to its thin and regular cross-section. Object 8.1707 presents a very triangular active section, which is very asymmetrical. The base of the biface slightly contracts, and is of trapezoidal shape. The right edge is unusual as it is bimodal, with bevels oriented towards either face at the opposing sides of the transverse fracture, likely the result of the application of an improper load during resharpening[iv]. Shaping of the piece was primarily done from the lateral edges, with some shaping done from the proximal edge with a distal orientation. A small plateau created by multiple minor step fractures during shaping is present on face B. Some invasive flake scars are present near the midsection of the piece, all produced during shaping. Retouch of the hafting section is non-consecutive, with removals generally following ridges created by prior retouching. It is to be noted that three large notching flakes were removed, two of these to create the left notch. The piece is heavily resharpened, with removals all along the edges of the active section, to the point of nearly obliterating the removals created by shaping on Face A. Resharpening on Face A is consecutive, with up to four removals initiated consecutively along ridges created during resharpening. Resharpening on Face B is non-consecutive, with removals being in general shorter than on the opposite face. The piece is resharpened bifacially in an asymmetrical fashion.

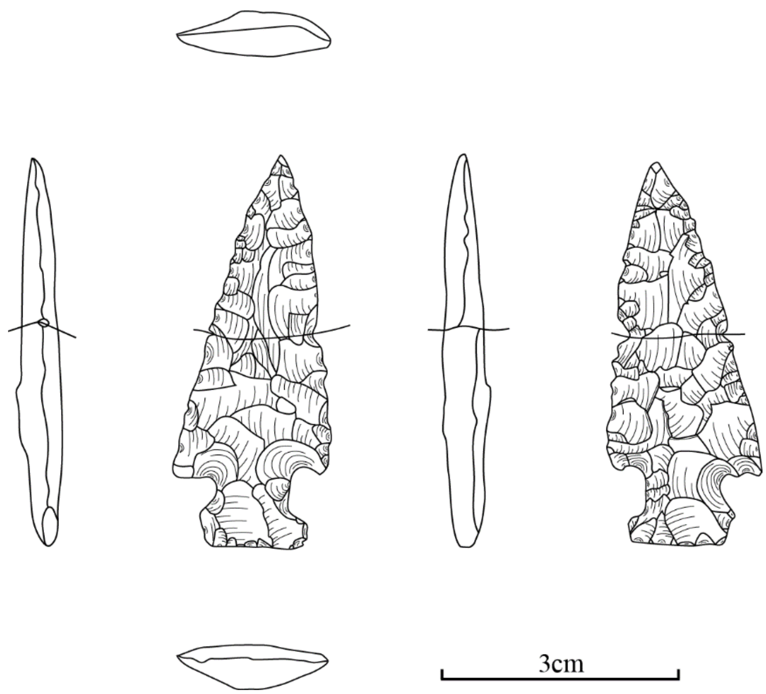

Figure 4.3.33: Drawing of objects BkEu-8.697 and BkEu-8.1707.

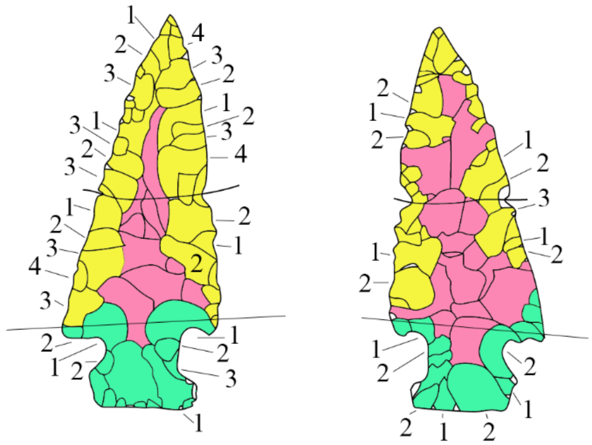

Figure 4.3.34: Diacritical scheme of object BkEu-8.697 and BkEu-8.1707.

Object BkEu-8.2450 (Figures 4.3.35 and 4.3.36) is a biface made of an altered quartzite, resembling heated Cheshire quartzite. This piece presents removals origination from the distal edge that are oriented towards the proximal edge, which can be indicative of use as a projectile, a perforator, or simply of an impact due to having been dropped. The piece has a thick lenticular cross section. The shaping of the piece was done exclusively from the lateral edges. Invasive flaking and step terminations occurred during the shaping of the piece. Retouch on the hafting section was done through non-consecutive removals following pre-existing ridges. The notches on the piece are relatively symmetrical, with blunted edges. Resharpening of the active section is non-consecutive and generally removals are initiated along ridges created during resharpening. However, some removals were still initiated along the ridges of removals create during the shaping of the piece. Most of the active section's edge has been resharpened bifacially in a symmetrical fashion.

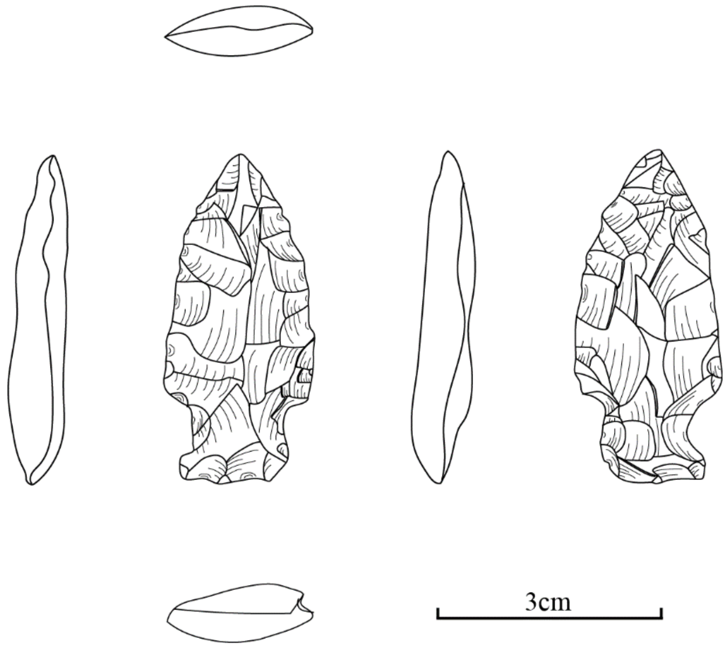

Figure 4.3.35: Drawing of object BkEu-8.2450.

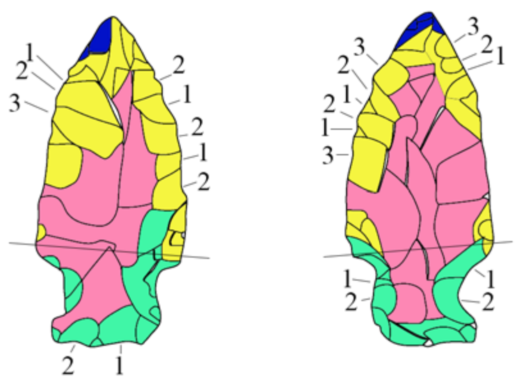

Figure 4.3.36: Diacritical scheme of object BkEu-8.2450. Dark blue: Potential use damage.

Object BkEu-8.2152 (Figures 4.3.37 and 4.3.38) is made of a lustrous dark grey chert from an unknown source. This piece presents a slightly lipped transverse fracture at its base. This fracture is likely to have occurred during the use-life of the object, as all removals emanating from the proximal edge precede the transverse fracture. The possibility that the piece was shaped perpendicular to the axis of this tabular surface is therefore rejected. This object has a relatively plano-convex cross section. The shaping of the piece was generally conducted from the lateral edges, though some larger removals emanate from the proximal edge on Face A. Some covering removals are present, mainly on Face A. Retouch of the hafting section appears to generally be independent of the ridges created during the shaping of the piece, with removals using ridges created during retouch. Retouch of the notches is unifacial for the right notch and bifacial for the left notch. Resharpening on this piece is asymmetrical, is present along the full length of the active section, and was conducted in a non-consecutive manner. Removals are both generally short and independent of the ridges created during the shaping of the piece. Step terminations are very common among the removals considered to be the result of resharpening. Resharpening removals emanating from the left edge on face B appear to be of a more substantial size than those on other areas of the biface.

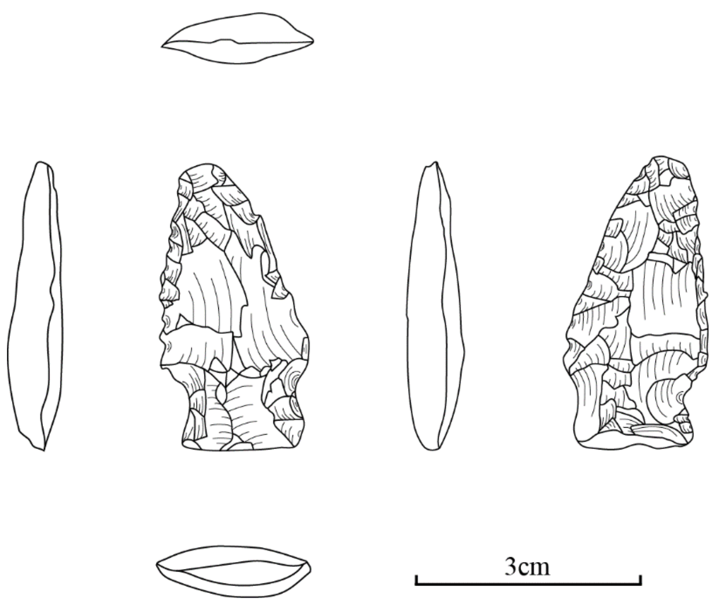

Figure 4.3.37: Drawing of object BkEu-8.2152.

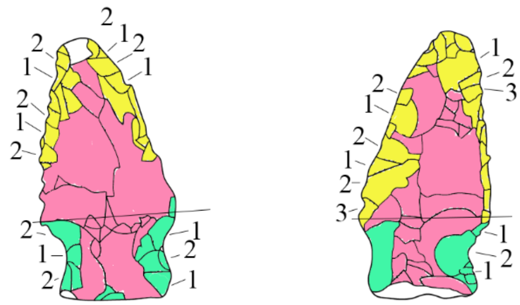

Figure 4.3.38: Diacritical scheme of object BkEu-8.2152.

Object BkEu-8.3091(Figures 4.3.39 and 4.3.40) is made of what appears to be a green Appalachian chert of undetermined source. The piece presents a distal transverse fracture displaying important lipping. Though this fracture is a potential indicator for the use of this biface as a projectile point, traceological analysis would be necessary for confirmation. The cross section of this biface presents slight double bevel. The shaping of this piece was executed from the lateral edges. Covering removals are present on both faces of the piece, as are step terminations created during shaping. Retouch of the hafting section appears to be independent of ridges created prior to retouching, with removals being initiated from ridges of other removals created during retouch in a non-consecutive manner (apart from the proximal edge of Face B). Resharpening is present along the entire length of the active section of the piece and is symmetrical, but it is discontinuous among both faces. Removals are non-consecutive and mostly seem independent of the ridges created during shaping. Some step terminations are present among the removals considered to be the result of resharpening. The removals of the left edge are most abrupt on Face B, likely due to a greater thickness encountered along that part of the piece.

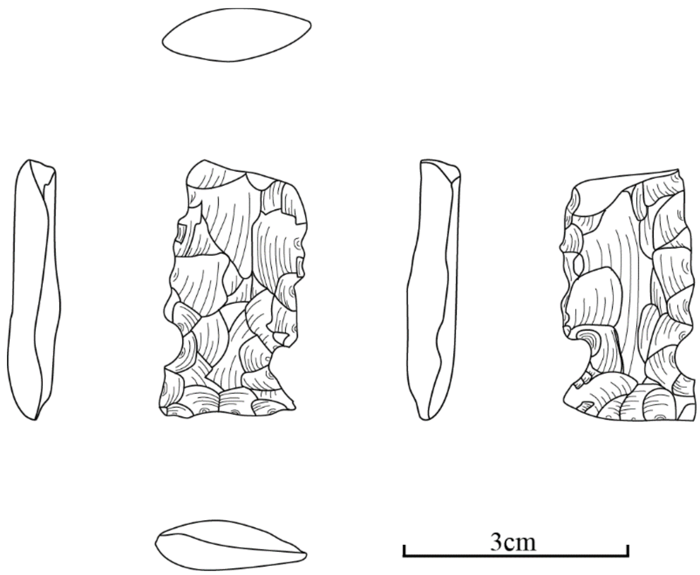

Figure 4.3.39: Drawing of object BkEu-8.3091.

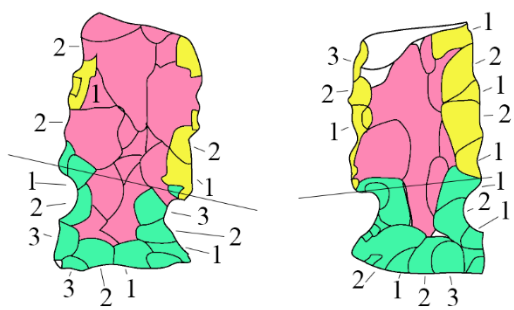

Figure 4.3.40: Diacritical scheme of object BkEu-8.3091.

Object BkEu-8.1426 (Figures 4.3.41 and 4.3.42) is made of a dark grey variant of the locally available silicified mudstone. The piece has a plano-convex cross-section, with Face B being exceptionally flat and Face A presenting a plateau created by repeated step terminations. The shaping of this piece was executed from the lateral edges on face B, whereas Face A may have had some removals originating from the proximal edge during shaping. Both faces present covering removals, invasive removals, and step terminations created during shaping. Of note, the central line, created by the convergence of removals originating at opposing side, is skewed heavily to the left on both faces of the piece. Retouch of the hafting section was done through short non-consecutive removals on both faces. Retouch of the notches is minimal, with no visible removals created during retouch on the left notch. Material failure may be the cause of this absence, in that removals were attempted but breakage ensued instead of a controlled removal. The knapper continued as such until the desired notch shape was attained. Removals originating from the proximal edge appear to follow ridges created by removals during the shaping of the piece. In contrast, the notches appear to be relatively independent from previous removals and were retouched unifacially. The active section of the piece appears to have been resharpened along its full length of its edge on both faces, in an asymmetrical fashion. Removals are non-consecutive and generally short, with step terminations being relatively common. Ridges created during shaping appear to be exploited when they are present, otherwise it is ridges created during resharpening that are used.

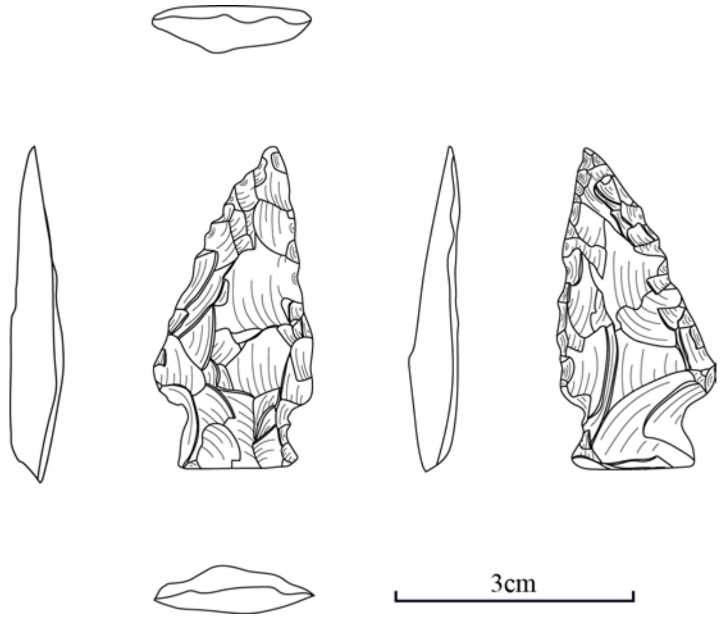

Figure 4.3.41: Drawing of object BkEu-8.1426.

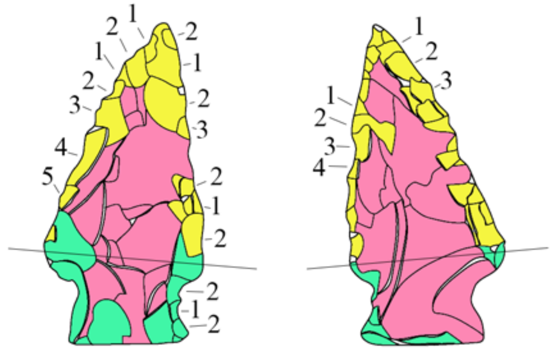

Figure 4.3.42: Diacritical scheme of object BkEu-8.1426.

Many strong convergences are present among Normanskill bifaces, though not every technical trait was possible to observe on all objects (Figure 4.3.43). Shaping in general tends to be dichotomized, wherein only two choices are made for the ensemble, though variation in mistakes and control of facial symmetry are noted. The mechanical properties of materials seem to play a role in some choices, notably in terms of haft retouch in the case of the local silicified mudstone, where raw material failure resulting in notches being formed through controlled breakage instead of controlled removals. Greater variability is present in the retouch of pieces, both in terms of placement of retouch removals and their relation to shaping removals. Some differences in the application of pressure techniques is noticeable, with two extremes observable: object BkEu-8.3091 presents steep retouch removals on its hafting and active sections, such steepness is the result of both the angle of the platforms exploited and the application of a load at angle pushing to the exterior of the object (Magnani, et al. 2014). At the other end of the spectrum, Object BkEu-8.1707&697 present removals that are much more plane, likely resulting from more acute platform angles and the application of a load oriented towards the inside of the piece (Dibble and Rezek 2009). Resharpening of the pieces poses an interesting problem; two pieces, BkEu-8.1426 and 2152 possess the same choices and mistakes, and are quite similar throughout their sequences apart from variations due to raw material properties and facial symmetry, but another biface, BkEu-8.1707&697 presents most of the same resharpening choices, minus the mistakes. Proposing meaningful relationships between the former two may be hazardous due to the latter.

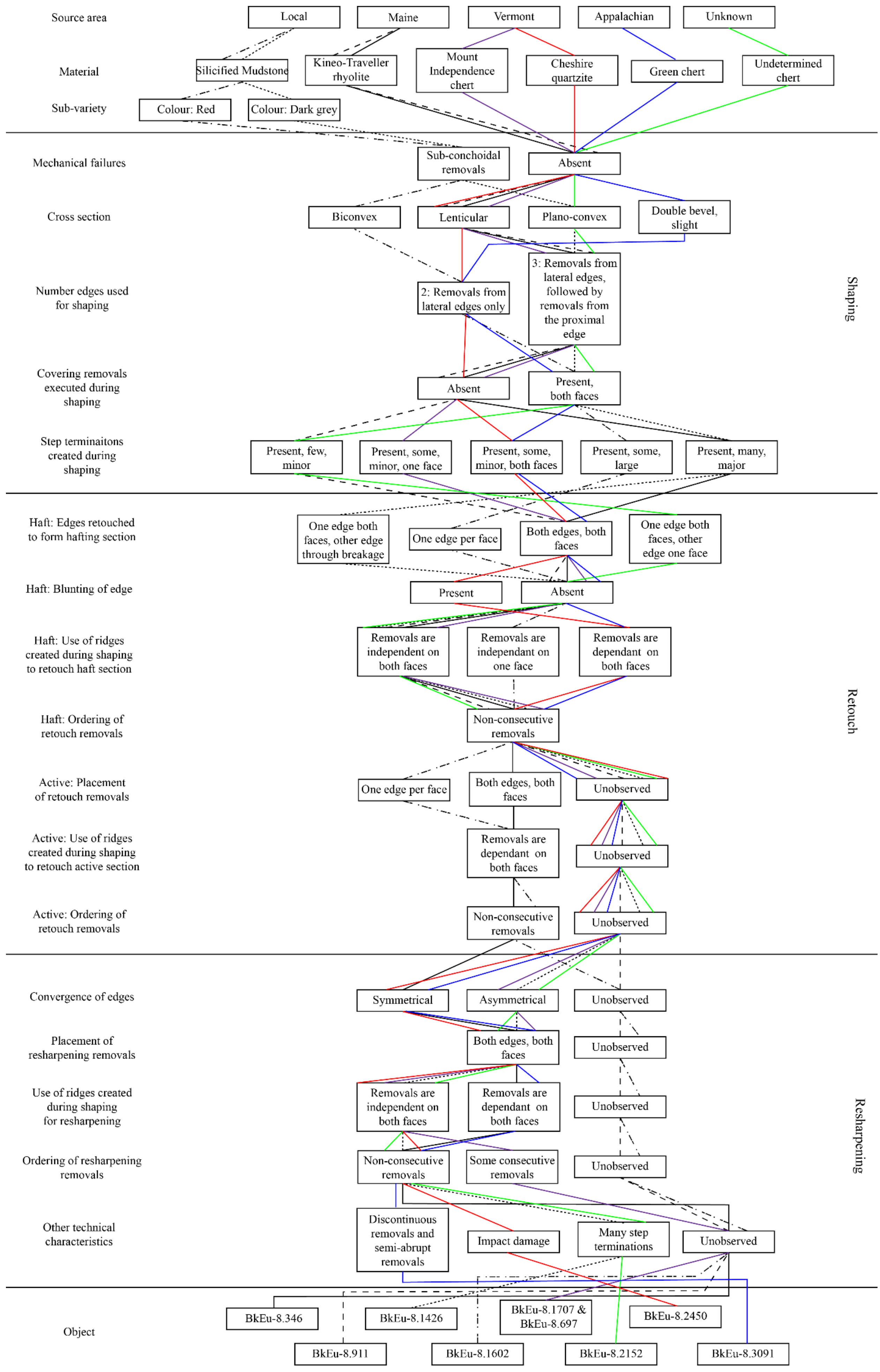

Figure 4.3.43: Sequence of choices and mistakes present among Normanskill bifaces.

Genesee biface

A single example of the Genesee type is present in the assemblage (Figure 4.3.44). Made of a heavily weathered stone assumed to be hornfelsified Utica shale. However, it would be necessary to polish or to saw the artifact to confirm this attribution, as misidentification is more likely to occur for heavily weathered materials, occasionally leading to erroneous identification of geological origins (see Gauthier and Burke 2011 for a discussion of this topic). Piece is quite large and presents a transverse fracture slightly further than its midpoint. Due to the heavy weathering of the piece no diacritical schema was produced and its drawing is not included. It is however to be noted that removals on the piece surpass the midline of the piece. Volumetrically the piece is quite impressive, with a near perfect symmetry of faces, visible as a near lenticular cross-section. It is unknown if there are any removals emanating from the proximal edge of the piece. As the piece was not recycled as a scraper or otherwise, it can be hypothesized that recycling was likely perceived as unnecessary at the time of deposition.

Figure 4.3.44: Object BkEu-8.544, Face A.

Snook kill bifaces

Three bifaces are attributed to the Snook Kill type (Figure 4.3.45). All examples have been shaped from undetermined materials, with one (Object BkEu-8.2842) being made of a weathered banded spherulitic rhyolite. Only one of the bifaces has been recycled, BkEu-8.3084.

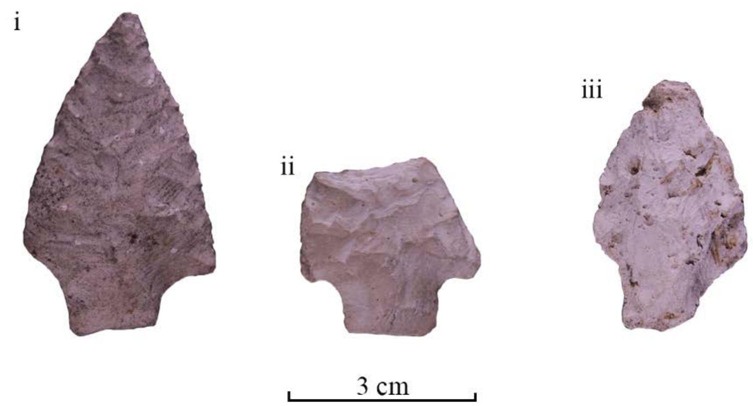

Figure 4.3.45: Bifaces identified as being of the Snook Kill type. I) BkEu-8.2842. II) BkEu-8.3084. III) BkEu-8.2857.

Object BkEu-8.2842 would be classified as a large form in the Cresson model, and is made of a banded spherulitic rhyolite of undetermined origin (Figures 4.3.46 and 4.3.47). The piece presents a plano-convex cross section, with the brunt of its convexity at its shoulder. It has been proposed elsewhere that the placement of an excessive thickness at the shoulder of large form Broadpoint bifaces is indicative of in-haft resharpening (Kraft 1990). The piece appears to have been shaped through removals initiated along its lateral and proximal edges. The shaping and retouching of the hafting section appears to have been done through a mix of soft hammer percussion and pressure flaking, wherein the contraction was formed through semi-abrupt percussion flaking and finished by pressure flaking along the newly created ridges in a non-consecutive fashion. If the piece was shaped from a pentagonal preform, conforming to the Cresson (1990) model, this would indicate a second phase of shaping after the retouching of the preform. The simplified sequence would therefore be: Blank, Shaping 1, Retouch 1, Pentagonal preform, Shaping 2, Retouch 2, Snook Kill biface. Resharpening is relatively inconsistent along the edge of the active section, with the most identifiable resharpening being located at the distal extremity of the piece. Removals attributed to resharpening on this piece tend to be short and non-consecutive, occasionally ending with step terminations.

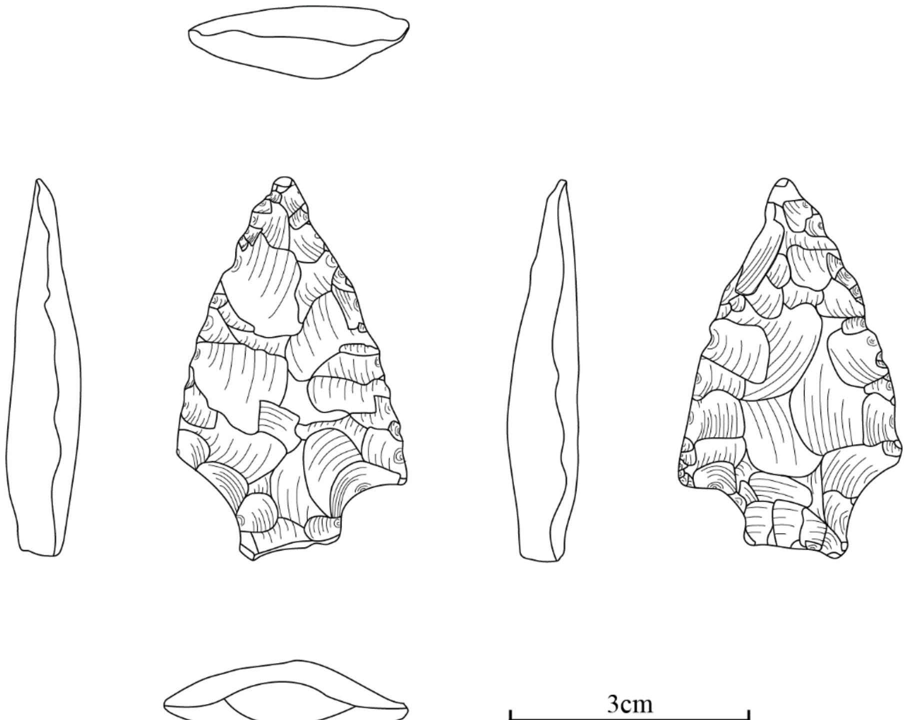

Figure 4.3.46: Drawing of object BkEu-8.2842.

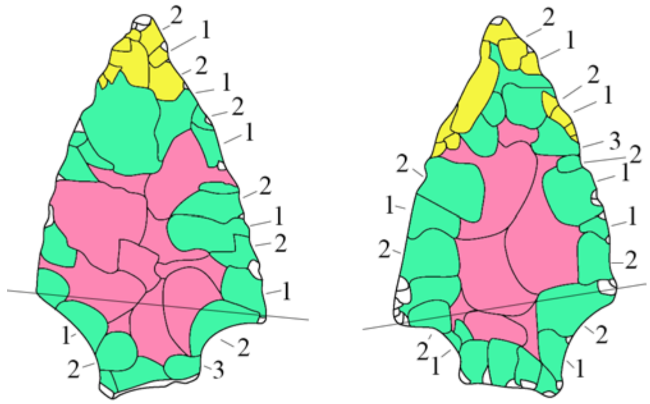

Figure 4.3.47: Diacritical scheme of object BkEu-8-2842.

Object BkEu-8.3084 (Figure 4.3.48 and 4.3.49) can be classified as a small form in the Cresson model. The piece appears to be made of a heavily weathered chert or rhyolite, though polishing would be necessary to produce a fresh surface to confirm the identification. This object is quite thin, and does not appear to have been intensively shaped. Though it is possible that a thin flake blank was used to produce this piece, the absence of visible blank characteristics precludes this analysis. Shaping of this piece was done along both lateral edges, with no evidence of shaping occurring from the basal edge apart from a large removal struck with a diagonal orientation on Face B. This removal may be a remnant of the external surface of the blank utilized to produce this object. The hafting section was formed through large non-consecutive removals, likely during shaping. The piece appears to have been resharpened to a certain extent, displaying an asymmetrical blade section oriented laterally, with most removals being small, non-consecutive, and on occasion displaying step terminations. The piece also appears to have been recycled and repurposed into a wedge: Multiple removals with step termination originate from the distal edge, which is perpendicular to the lateral edges. The base of the piece also presents a transverse fracture, though its cause is unknown, and a small removal which appears to not have been produced during the shaping or retouch of the piece.

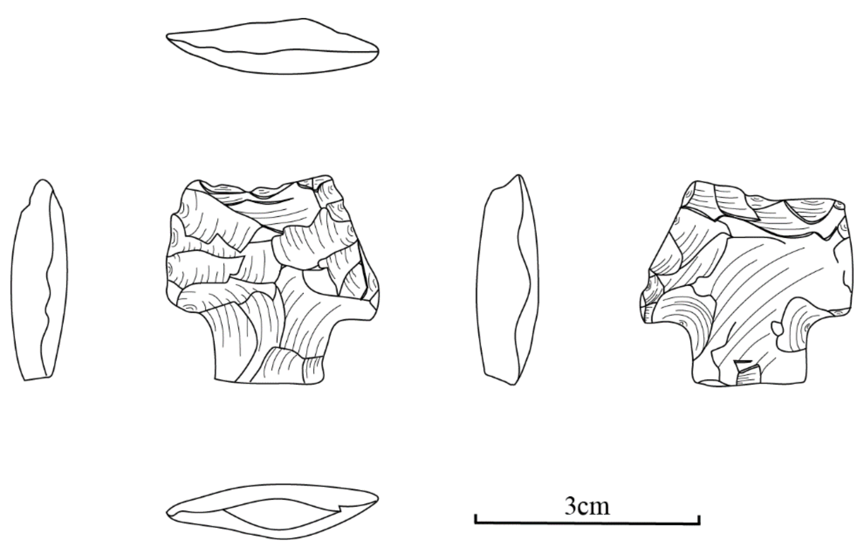

Figure 4.3.48: Drawing of object BkEu-8.3084.

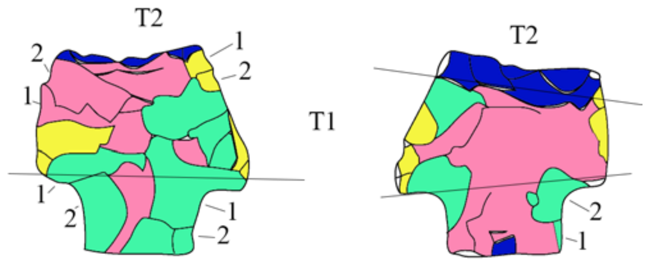

Figure 4.3.49: Diacritical scheme of object BkEu-8.3084. T1: Transformative group 1, likely a cutting/penetrating function. T2: Transformative group 2, likely a wedging function. Dark blue: possible use damage.

Object BkEu-8.2857 is relatively ambiguous as to subtype, due to its heavy weathering and modification due to post-depositional processes. This biface presents damage along most of its edges, usually resulting in 90 degree surfaces instead of a bifacial edge. The raw material is undeterminable due to alteration, but it is plausible that it may in fact be a heavily weathered rhyolite. Due to its condition, it was deemed unnecessary to produce a diacritical schema. The remaining evidence seems to imply that the piece was shaped along two edges prior to the shaping of its base. Little can be said of the retouch and the resharpening of this piece, as the edges and distal section are too heavily fragmented to be of use. The object in not included in the summarization and comparison of operational sequences due to it heavily damaged state.

Objects BkEu-8.2842 and 3084 are greatly distinguished by their operational sequences prior to their resharpening (Figure 4.3.50). The choice of blanks may explain an extent of this difference, as blank properties and volumetrics will tend to bring other choices made throughout the sequence to compensate. Although the proximal area is contracted during shaping for both bifaces, only the former of the bifaces presents removals attributed to resharpening in this section. The absence of removals attributed to retouch for the latter may likely be due to the interpretation and segmentation of processes by the observer, where the removals appear to fit better in the shaping pigeonhole due to their technical characteristics. As for their similarities during their resharpening, it may be due in part to small sample size and to the fact that in general, there is little technical variation in resharpening at the assemblage level, i.e. few technical choices are available or known. Both objects present different schemes of reuse, wherein the former object was rejected without recycling and the latter appears to have been recycled as a splitting tool.

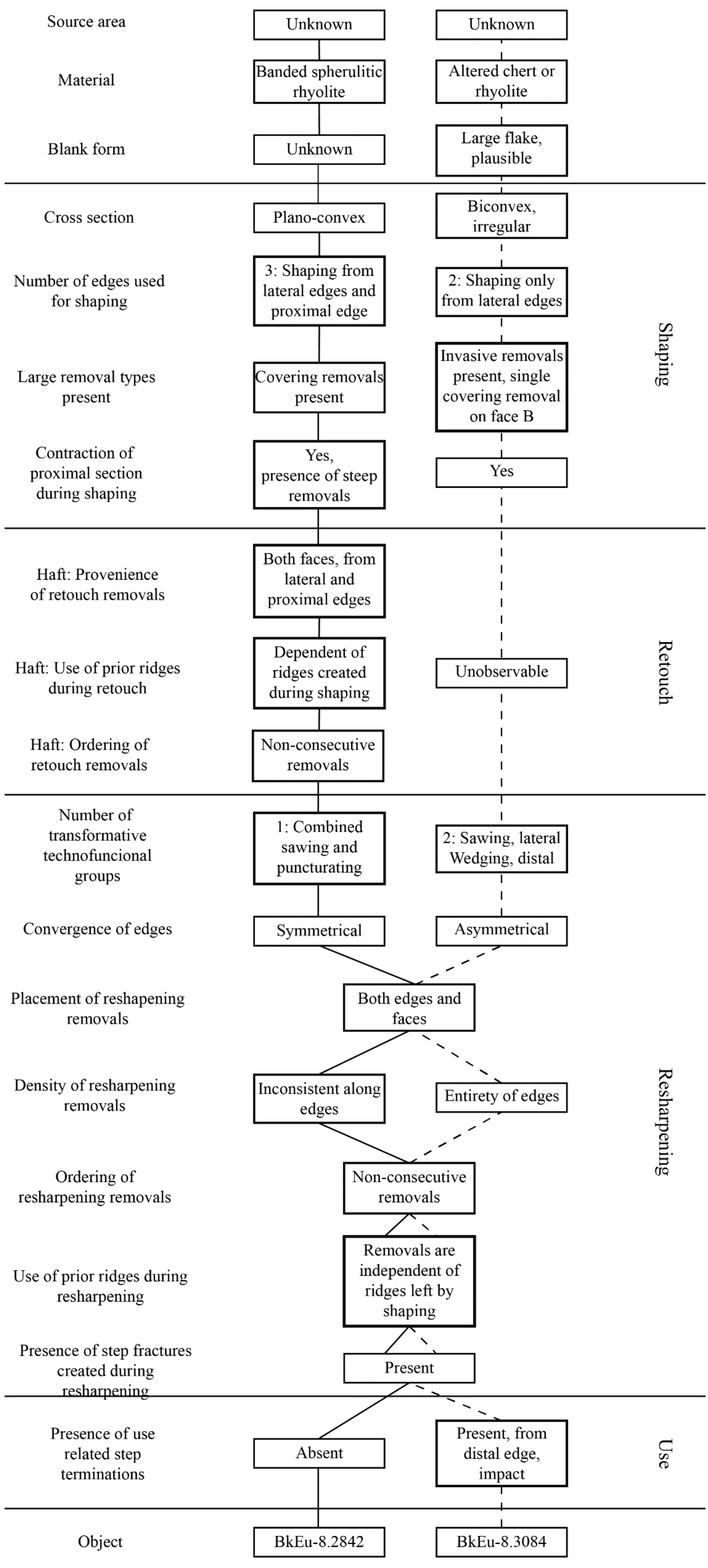

Figure 4.3.50: Sequence of choices and errors present among Snook Kill bifaces

Perkiomen biface

A single biface of this type, object BkEu-8.599, was identified (Figures 4.3.51, 4.3.52 and 4.3.53). This piece is made of a dark grey chert which is partly weathered and is of an undetermined source. The biface was recycled as an endscraper, though it is unknown if this repurposing is due to a loss of length caused by excessive resharpening or due to a transverse fracture of the active section. This piece appears to have been shaped by removals initiated from both lateral edges and from the proximal edge, though little evidence remains of the removals originating from the proximal edge. Large step terminations are present on Face B of the piece. Retouch of the hafting section of the piece was done through steep non-consecutive removals. The steepness of these removals is likely due to the thickness of the piece. The notches were formed by large removals and appear to have been completely blunted, either through purposeful blunting or during the notching process by multiple failures to remove flakes. No edge is evident within the notches, though the remaining removals indicate that they were formed by removals on both faces. Resharpening of the piece was done unifacially through steep non-consecutive removals all originating from Face B. Some step terminations are present on the distal edge, possibly due to the use of the object.

Figure 4.3.51: Face A of object BkEu-8.599.

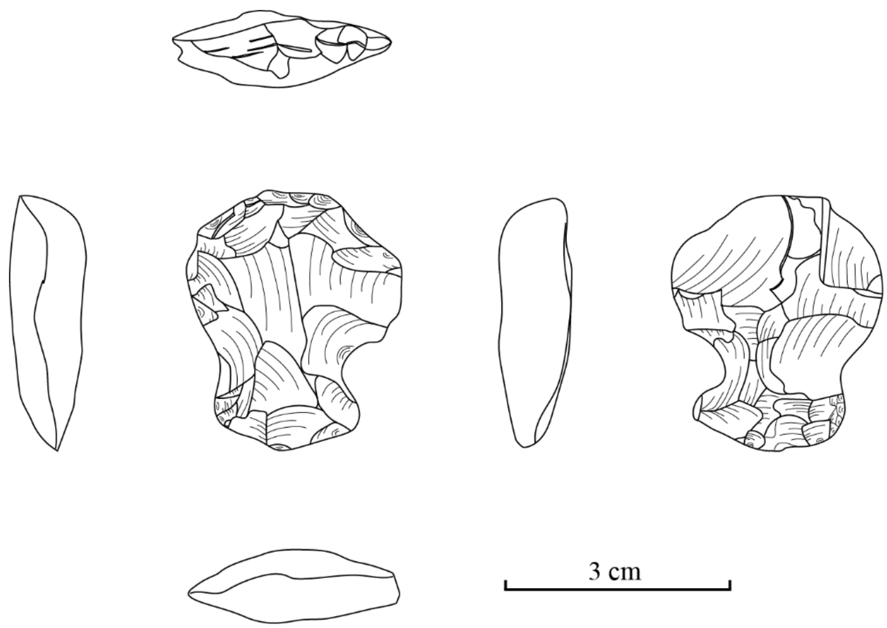

Figure 4.3.52: Drawing of object BkEu-8.599.

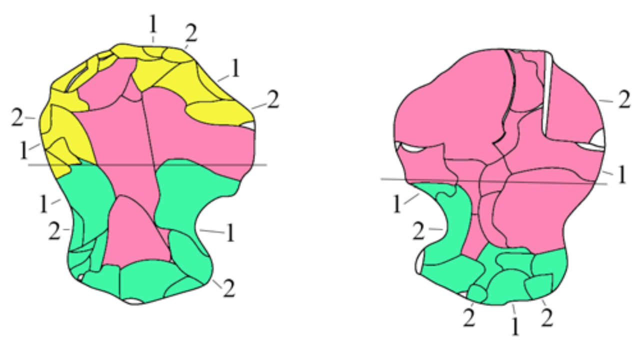

Figure 4.3.53: Diacritical scheme of object BkEu-8.599.

Orient bifaces

Two Orient bifaces are present in the assemblage (Figure 4.3.54). One is of a rhyolite bearing similarity to the Kineo-Traveller rhyolite (BkEu-8.2762) and the other appears to have been made upon an undetermined green Appalachian chert (BkEu-8.3025).

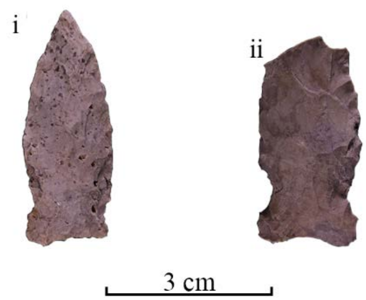

Figure 4.3.54: Bifaces identified as being the Orient type. I) BkEu-8.2762. II) BkEu-8.3025.

Object BkEu-8.3025 (Figures 4.3.55 and 4.3.56) is an interesting case: The piece appears heavily retouched, presenting a very pronounced double beveled cross section when viewed from its distal edge. It is both quite thick and narrow. The piece appears to have been shaped through removals on both lateral edges, with some covering removals visible on both surfaces. However, this may be a case where secondary shaping may have been done to facilitate further resharpening, as most removals attributed to shaping are rather abrupt. Retouch of the hafting section of the piece was done mainly through short non-consecutive removals, exploiting pre-existing ridges when possible. The concave proximal edge appears to have been obtained mainly by short removals on Face A that are independent of the removals produced during shaping. Resharpening of the piece, at least in the case of the immediate area of the edges, was generally produced through short removals on both faces, many of which present step terminations. Sets of consecutive removals are present on the active section. Unsurprisingly, the edges of the piece present a significant twist that increases distally.

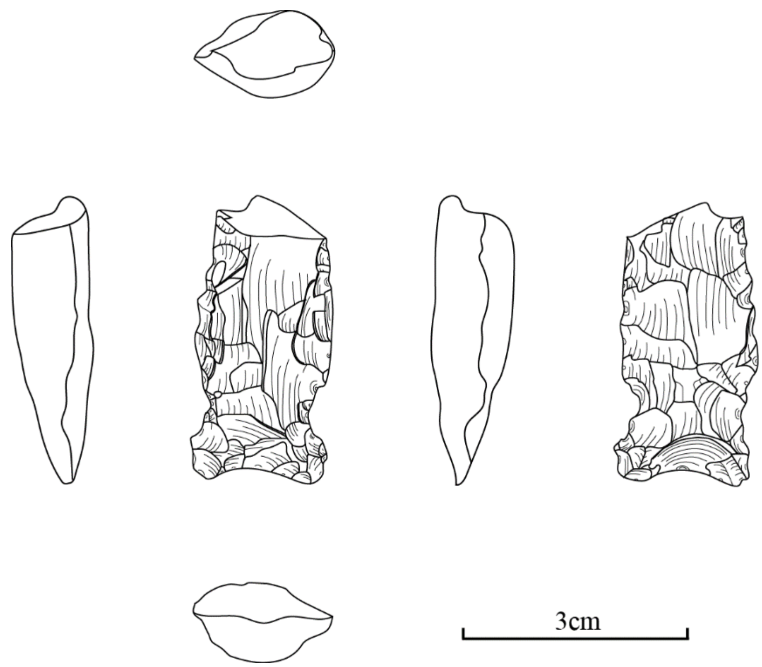

Figure 4.3.55: Drawing of object BkEu-8.3025.

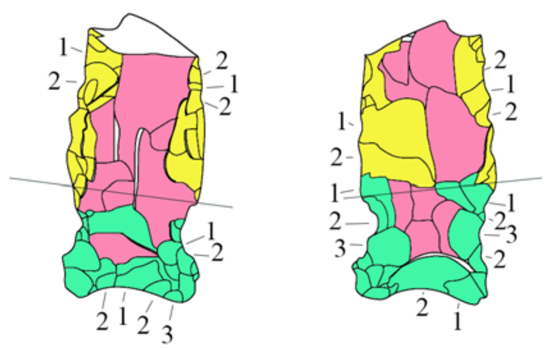

Figure 4.3.56: Diacritical scheme of object BkEu-8.3025.

Object BkEu-8.2762 (Figures 4.3.57 and 4.3.58) differs from the previous piece by the biconvex cross section of its active section and the plano-convex cross section of its hafting section. Shaping of the piece was executed by removals initiated along both lateral edges, and along the proximal edge on Face B. Many step terminations are present among removals attributed to shaping. Retouch of the hafting section was executed through short non-consecutive removals, generally independent of the ridges left by removals attributed to shaping. Removals attributed to retouch of the hafting section are mainly present on face A, with some minor removals on face B. Retouch of the active section is in general comprised of short non-consecutive removals occasionally ending in step terminations. There are, however, sets of consecutive removals present on both faces of the piece.

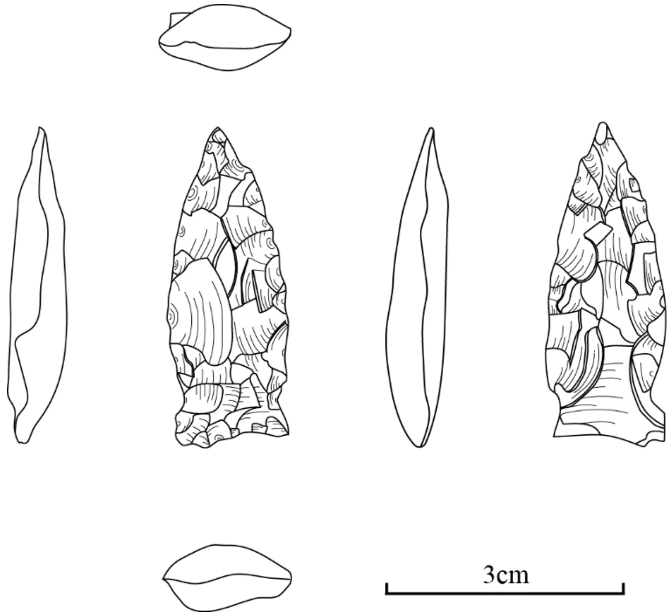

Figure 4.3.57: Drawing of object BkEu-8.2762.

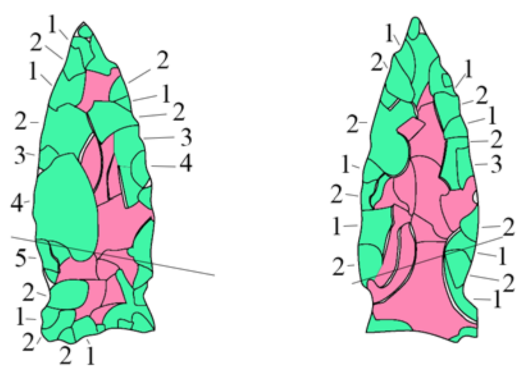

Figure 4.3.58: Diacritical Scheme of object BkEu-8.2762.

Much like the Snook Kill type, few convergences are present between both sequences of Orient-like bifaces (Figure 4.3.59). The small sample size may be a cause of this distinction, in that there would be more opportunities for convergence if a greater number of artifacts were of this type. In this case, it appears that technical extremes were observed. The only convergences are for the ordering of removals during retouch and resharpening, which is unsurprising, considering that few choices are made in this regard throughout the observed sample.

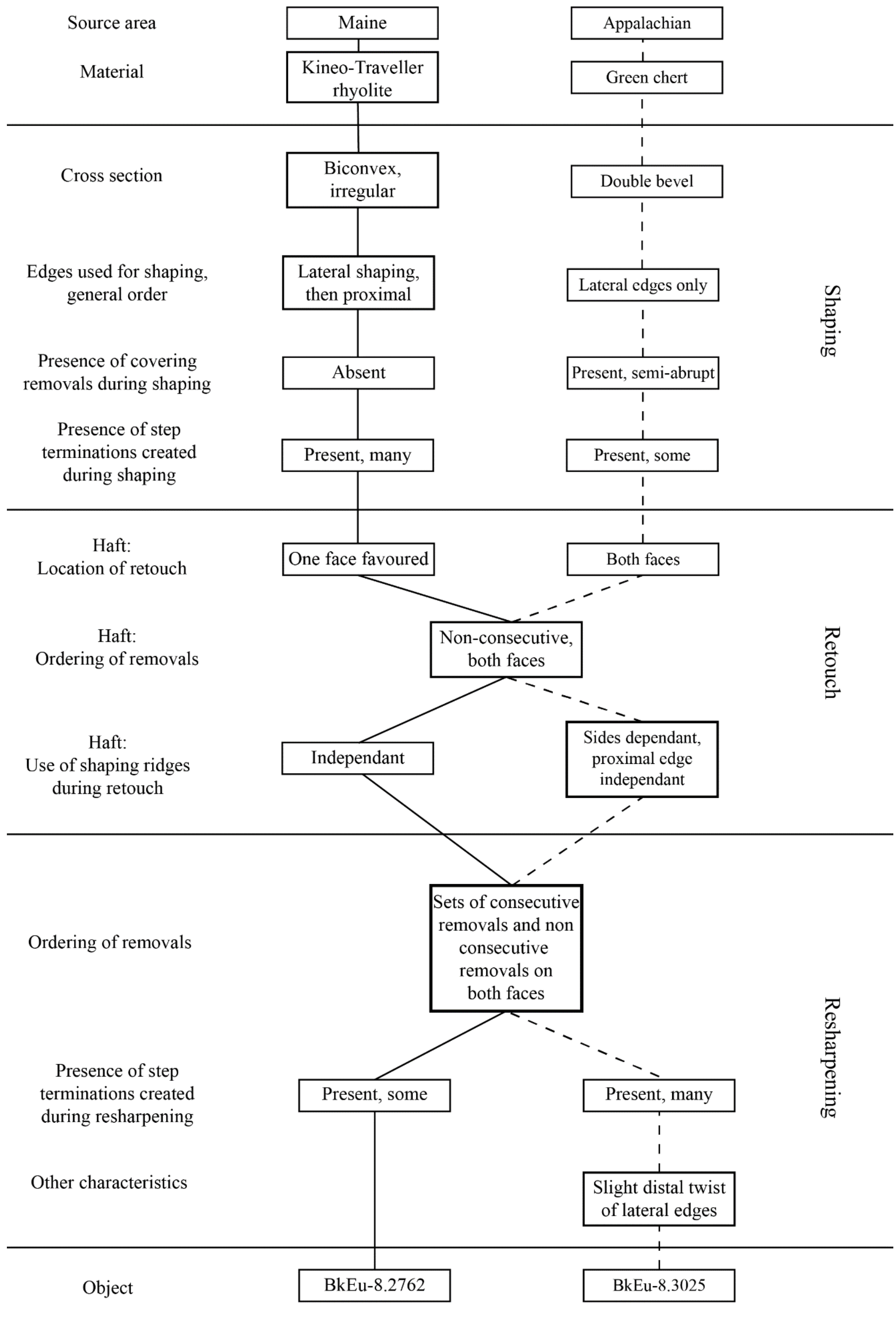

Figure 4.3.59: Sequence of choices and mistakes among Orient bifaces

Mansion Inn biface

A single example has been identified within this type, object BkEu-8.1976 (Figures 4.3.60, 4.3.61 and 4.3.62), and seems to comply with the smaller Dudley variant (Dincauze 1968: 19, fig. 2). This object was shaped from an altered semi-translucent black chert, sharing affinities with some variants of Mount Independence chert. A large crinoid pseudomorph is present on a natural cleavage plane on Face B. Removals made during the shaping phase were initiated from both lateral edges, then removals were initiated from the proximal edge. Proximal removals on Face A are consecutive, whereas the removals are non-consecutive on Face B. Both faces present covering removals originating from the proximal edge and the right lateral edge. No covering removals originate from the left lateral edge on either face. Retouch on the piece was done with short and long non-consecutive removals on both faces, exploiting ridges produced during shaping when possible. The distinct low-shouldered pentagonal shape of the piece was obtained during retouch, by short non-consecutive removals on face B. It is likely that the piece had a relatively rounded proximal area, which would have facilitated this operation. The longest removals produced during retouch are present along the lateral edges, distal from the shoulder. The piece presents several irregular breakages, having been fragmented into at least four pieces prior to deposition.

Figure 4.3.60: Face A of object BkEu-8.1976.

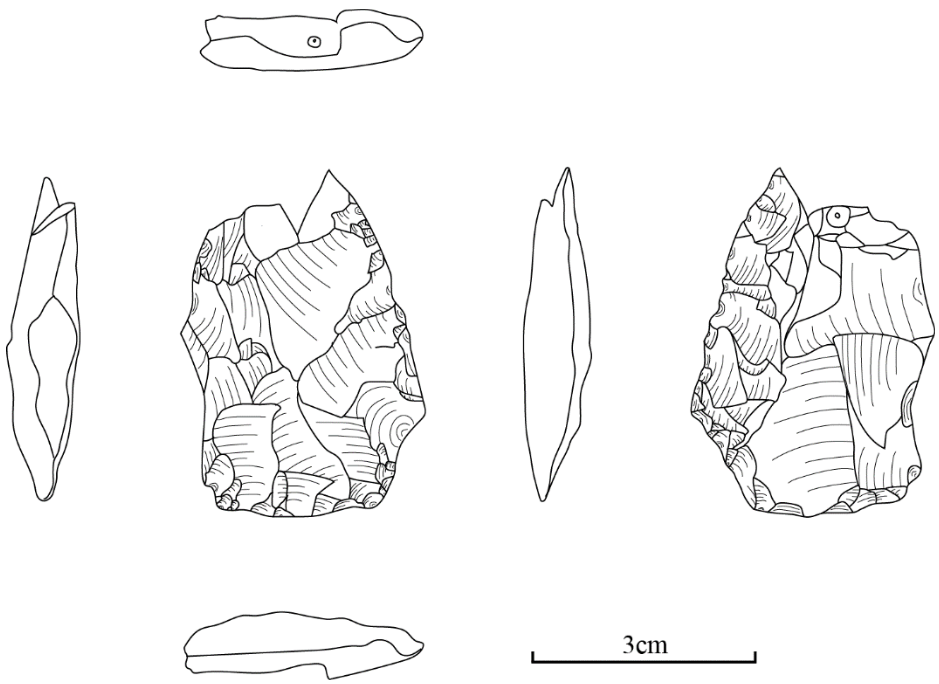

Figure 4.3.61: Drawing of object BkEu-8.1976.

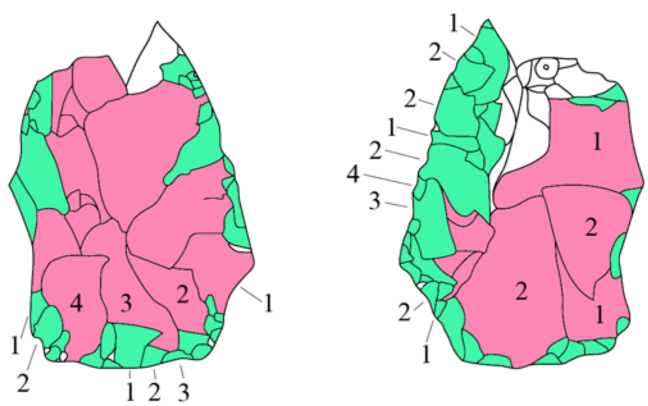

Figure 4.3.62: Diacritical scheme of object BkEu-8.1976.

4.4 Summary

Most choices observed are visible among most if not all types identified. Should typology be disregarded (and the implied volumetrics), it is likely that objects of different types would converge due to choices made throughout their creation and use. This is evidently unsurprising given the limited repertoire of techniques used in bifacial shaping. Though variation is present throughout the observed sequences, no stark contrasts occur generally between the retouching and resharpening of individual objects. The final preparation of the different techno-functional groups is therefore generally identical unless the transformative group has been repurposed for different, undetermined, roles. Between observed periods, there are continuities in raw materials utilized. In the case of discontinuities in raw material use, other materials from the same general vicinity occur in the assemblage (Onondaga vs Selkirk). It is likely therefore that there is the persistence of acquisition schemes and/or regional relations between periods.

5. Discussion

5.1 Sequences and economy

Although complete techno-economical information for the operational sequences is unavailable due to contextual constraints, i.e. absence of a controlled context which would allow diagnostic forms to be associated with ambiguous and non-diagnostic forms, the observed sequences can still provide some information on the economics behind the objects.

Most raw materials utilized to produce the macrotools analyzed cannot be linked to a particular region, although some can be linked to the local geological context. For the case of object BkEu-8.3119, a grinded shale “point”, all elements of the sequence can plausibly be obtained within the local area, if not the immediate environment of the site. This includes the shale blank for the point, for the ridged hammerstone and the abrader, and could all have plausibly been prepared by the occupants of the site at some point or another during the occupation of the site. In all likelihood, these elements were obtained through direct acquisition, though a few unknowns remain in the sequence, such as the form of the shale blank, its geological context (primary or secondary), and how the blank was produced. As for the ridged hammerstone, its raw material could have been obtained in any river due to the ubiquity of quartz cobbles, and could easily have been obtained in the rivers flowing next to the site. With this considered, it is unlikely that any element of this operational sequence has been obtained through exchange. The only plausible form of exchange that can be hypothesized in this instance would be demand sharing or intragroup reciprocity. However, there are no evidences of this having affected the operational sequence, with possible distinctions likely being invisible archaeologically due to the surface treatment of the primary object. As the hypothesized sequence to produce the point involves the sequences for two others tools, which are otherwise unrelated from the standpoint of production techniques, it is sounder to assume that should any of the objects be associated, they are likely to have been produced and utilized by a single individual or a relatively restricted group of individuals. The site being a palimpsest, the associations proposed here are tenuous at best.

As for the Brewerton bifaces, none of the raw materials utilized are available in the local area. However, the shaping of three of the bifaces bear great similarities. This poses a slight techno-economical problem when placed in the context of the raw material sources utilized, as the network spans roughly 1000 kilometers from the most distant source to the west to the nearest source to the east. The similarities between the bifaces can have multiple causes. The first of these is that the bifaces were obtained in similar, less terminal, forms and their shaping was finished at some point or another by the occupants of the site. Another possibility is that, even though the distances are great, that there is a certain technical uniformity between regions, resulting either through similar know-hows at both ends or a convergence of choices due to the shared project, which in this case results in the creation of a qualitatively broad biface. One of the objects, BkEu-8.463, is an outlier in terms of shaping and does not necessarily support either hypothesis, as it is expected that there is a certain variability in shape and volume in relation to differences in raw material properties (Eren, et al. 2014). Differences between the convergent bifaces are more noticeable further in the sequences, which supports the technical convergence hypothesis. In sum, no interpersonal segmentation is visible for this group, in part due to the absence of local raw materials among the type, but also due to the inversion of the expectation, wherein objects would begin different but converge later on in the sequence. From a more general point of view, the raw materials of the objects can give an idea if there is indirect acquisition, as three of the four materials are available within 200 kilometers of the site. The final of the four, BkEu-3118, has a source area located, at most, at around 750 kilometers. As interpersonal segmentation cannot be ascertained for any of the bifaces, this marked source distance may be the only indication of indirect acquisition, though no other direct indicators were observed. It must be noted, however, that this object is isolated from the three others, being near the northern extremity of the Central sector, whereas the others are all found within the Contact zone. It is therefore likely that this final object is the result of a different occupation of the site. In the case of the other Late Archaic shaping project, the lone Vosburg biface is most likely the result of direct acquisition, due to the proximity of a primary geological source of silicified mudstone and the ubiquity of this material in the region. The information it supplies does not aid the interpretation of the other bifaces, as it is of a completely different project.

The Lamoka bifaces present a similar case, wherein recurring themes are present in the shaping of the bifaces, though no true uniformity is present. However, whereas the Brewerton-like bifaces diverge during the retouch phase, the Lamoka-like bifaces converge, and continue to converge through resharpening when it is present. Although this may support a hypothesis of indirect acquisition, as it is an evidence of inter-individual segmentation, certain caveats must be examined. Firstly, considering that as a whole, there are few choices made in general in regards to retouch and resharpening at the level of the assemblage, it may simply be a coincidence that these similarities may be present. Secondly, little to no layering of removals is visible among the bifaces, at times rendering the interpretation of removals as shaping or retouch extremely arbitrary. Should the removals have been misinterpreted, the variation noted as being from the shaping of the pieces may in fact have been a result of the retouching of the bifaces. As before, no techno-economical information is available due to the sampling. However, object BkEu-8.1237 obliges some extra considerations. This object, made of Cheshire quartzite, is highly irregular and contrasts with the other bifaces placed within this category. At an impressionistic level, it appears to be the work of a less skilled knapper. Evidently, differences in raw material properties and the experience of the knapper with the material can produce this kind of differentiation. Assuming that the object was never functional, as no damage relatable to use and no resharpening is evident[9], it would be likely that the shaping of this object was completed on the Gaudreau site. The multiple mistakes, and the inability to correct said mistakes, can be indicative of a lack of experience with the raw material on the part of the knapper, or a less developed know-how in regards to knapping techniques. The source area being at a distance greater than 150 kilometers, it would be easy to assume that the raw material was obtained indirectly as an uncompleted form, to finally be completed and rejected by a lesser

[9] It is however to be noted that due to the grainy texture and the translucency of the raw material, edge damage can be difficult to properly identify.

skilled individual. Such an interpretation is evidently not made upon solid grounds, and therefore it must not be taken at face value. On the other hand, objects BkEu-8.135 and BkEu-8.3080 are reminiscent of the problems affecting the Brewerton-like bifaces, in that they are very similar in many regards, but are made of raw materials from different source regions separated by great distances, with some possible source areas being in opposite directions from the Gaudreau site. Their similarities may be due to the constraints imposed by their project and the limited repertoire of techniques for chipped stone, although they are likely to have been made by individuals with similar know-hows.

Different tendencies are noted for Normanskill bifaces, where some variation is present at all observed moments of the sequence, although major convergences are also observed. Although most bifaces conform to the roughly triangular shape described by Dowd (1998), two do not. This should be unsurprising, as similar end forms can be obtained through different sequences (Whittaker 1994). Most visible morphological variation among bifaces attributed to this type appears to stem from resharpening, which is either symmetrical or asymmetrical. Most of the other choices are limited to outliers. Two subgroupings of bifaces can however be identified. The first sub-group, composed of both Kineo-Traveller rhyolite bifaces; is grouped due to the great similarities of the two bifaces (see chapter 4). Both bifaces are from the Central sector of the site, although object BkEu-8.911 was found during surface collection. When examined side by side no size distinction is observable, leading one to consider the possibility that both objects may have been produced by the same individual, as individuals tend to produce objects of limited variation in size (Eerkens 2000). Though it may be tempting to assert that both bifaces were produced by the same individual due to their extensive similarities, asserting individual technical styles is hazardous in a context such as that of the Gaudreau site. Such a claim would also be unverifiable through any means. The similarity of these bifaces can at most be attributed to similar know-hows among the occupants of the Central sector. This consistency is informative in regards to their acquisition, as the objects were most likely acquired in a similar form, although the form in which they were acquired remains unknown. The second sub-group, composed of objects Bkeu-8.1426 and BkEu-8.2152, is also formed along the basis of similarities although both bifaces are of different materials. The former is of a grey variant of the locally available silicified mudstone, whereas the latter is made of an undetermined altered fine grey chert. The shaping of both bifaces is similar, although the symmetry of faces and the volume is slightly different among the bifaces. Differences in raw material may be in cause, as it is for differences in retouching. The same can be said of resharpening, which similar down to the mistakes made, independent of material. It can therefore be proposed that both bifaces were produced with very similar know-hows and sequences, though spatial data cannot strengthen this relationship. If these objects are related, it would point towards an acquisition of the chert biface as a less shaped form should it be from another region. Assuming this proposition to be true, the interpersonal segmentation of operational sequences may mostly be through the transfer of incomplete objects, at least in the case of the chert biface. There is evidently a weakness in this interpretation due to the failure to identify the geographical origin of the chert biface. Therefore, direct acquisition cannot be ruled out.

No real propositions can be made in regards to the acquisition of raw materials for the Broadpoint Tradition bifaces on the site. This is in part due to the few bifaces per type and to the fact that of eight bifaces, three are of raw materials not identifiable beyond type. For bifaces with raw materials that are identifiable, the raw materials are the same as those found in both of the NSPT biface types (apart from the Hornfelsified shale and undetermined rhyolites). It can therefore be assumed that raw material networks do not differ significantly for both bifacial traditions. Although Broadpoint biface types appear to be more frequently made of more difficult materials (rhyolites, hornfels) in the Gaudreau collection, the small sample of these bifaces does not allow for such an interpretation. This is seconded by the absence of uncompleted forms in the analysis: As no uncompleted bifaces or other objects can be related to the diagnostic bifaces, due to contextual constraints, the full range of raw materials used by the occupants of the site during a given period cannot be confirmed. Sequenced Broadpoint bifaces tend to not present major convergences, and generally only converge slightly in resharpening. Compounded to this is the lack of spatial proximity for bifaces identified as being of the same type, though the usual caveats of disturbed sites apply nonetheless. It is also to be reminded that four of the types identified on site (Genesee, Snook Kill, Perkiomen, Mansion Inn) have either significant temporal overlap or are contemporaneous.

In turn, raw material networks remain relatively consistent between the Late Archaic and Terminal Archaic on the Gaudreau site, as most (4 out of 5) raw materials are utilized during subsequent occupations. Part of this consistency may simply be due to the analyzed length of time: The longer the timespan, the more opportunities there are for raw materials of different source regions the circulate into the same area (Wilson 2007b). The greatest consistency noted is that of the Kineo-Traveller rhyolite, present among five of the nine biface types identified (within a nearly 3000 year time span). Appalachian cherts are also consistently used, though this group of materials is absent from all true[10] Broadpoint types. The Terminal Archaic also add an entire host of other exogenous materials, though this is to be expected due to the differing sample sizes per period (5 bifaces for the Late Archaic and 21 for the Terminal Archaic). From a regional perspective, outside evidently from the materials of undetermined sources, only a single new source area is represented with the Terminal Archaic, the upper St. Lawrence valley (Hornfelsified shale). As for the local source, the locally available silicified mudstone remains a minor material among the diagnostic bifaces for both periods. Such an observation is unsurprising however given the proximity of the source of the raw material, and due to the shear amount of non-terminated bifaces made of this material upon de site (N=188). The over-representation of exogenous materials among the analyzed diagnostics may simply be due to their rejection and replacement by locally acquired materials. Evidently, this hypothesis is based upon circumstantial evidence.

When taken as a whole, it appears unlikely that bifaces were acquired as completed forms by their end users. It is more than likely that bifaces circulate at various degrees of completion. Apart from local materials, most raw material source areas noted for the Archaic occupations are situated at around 200 kilometers of linear distance, though in multiple directions. If the Appalachian cherts are disregarded, the incomplete network follows a relatively tight east to southwest axis. It likely that apart from the locally available silicified

[10] True is used in this case as a means to distinguish the periodically ambivalent Orient type from other Broadpoint types.

mudstone, groups occupying the Gaudreau site may have not had direct access to many of the source areas, therefore obtaining most of the objects through exchange with neighboring groups. In the published literature for sites around Mégantic Lake, the Kineo-Traveller rhyolite is considered to be acquired directly by groups of all noted archaeological periods, notably due to the proximity of the Mount Kineo source at Moosehead Lake and its ease of access through the regional hydrography. However, the distance from this source is doubled for the Gaudreau site, and is relatively similar to the distances of the source areas of the other raw materials identified. At the level of the assemblage, Graillon notes that rhyolites compose around 16.5% of the assemblage (Graillon 2011, 2012, 2013). Barring refitting, the proportion of these materials is essentially meaningless in human level terms (i.e. in terms of numbers of object circulating in and out of the site). A cursory examination of the rhyolite flakes on the site reveals the presence of not only Kineo-Traveler rhyolite or Mont Marbre rhyolite and of another undetermined rhyolite in rather large quantities. The quantities and characteristics of the rhyolite sub-assemblage indicate suggest direct acquisition of the materials involved. The conundrum of sourcing green porphyric rhyolites on the Gaudreau site will only be resolved through geochemical analysis. The positive identification of either rhyolite on the site would provide insights into the technological organization and land use of prehistoric populations in the Eastern Townships. Most Appalachian cherts are considered to have been obtained through exchange in the region (Letendre 2007). Direct acquisition may still be plausible for the Quebec and Touladi cherts, though geochemical identification would be necessary to pinpoint the origins of the cherts of the Gaudreau site. For all recognized periods in the region, Onondaga chert is assumed to have been obtained through exchange, which is highly probable given the distance of the source area (from 400km to more than 700km dependent from which area the material was extracted from the Onondaga formation). Mount Independence chert is yet unreported in the neighboring Megantic Lake region, whereas Cheshire quartzite is reported (Letendre 2007). This same dynamic is present for the Île-aux-Allumettes site in the more western Outaouais region (Burke 2003). It may therefore be likely that the former material, Mount Independence chert, would have been obtained infrequently through exchange as its presence is rather unique to the Gaudreau site in the region. This material is also more localized compared to Cheshire quartzite, which outcrops within a 100 kilometer north to south band (Boulanger and Hathaway 2006). There are therefore more opportunities for the latter material to be acquired by groups, and evidently more chances that the material will trickle its way north. It must however be noted that this proposed difference may be an effect of archaeological visibility due to the sparse literature of the regions surrounding the Gaudreau site.

When examined within the entirety of occupations of the Gaudreau site, the variability of raw materials occurring within the Archaic occupations is not greater than the whole. The difference however seems to stem from the representation of materials through object types. Apart from the diagnostic bifaces of the Archaic, exotic raw materials tend to be present in the form of unifaces. As an example, the variability of materials for Woodland diagnostic bifaces is lesser than that of the Archaic, with only six different raw materials including locally available silicified mudstone and quartz, whereas all materials present among Archaic bifaces are present among the unifacial assemblage of the site. Though it is likely that some of the unifaces present are related to the Archaic occupations, the pattern of high material variability for unifaces, especially in terms of exotic materials, is not unusual for the region. In Woodland occupations in the region, exotic raw materials tend to be present in the form of unifaces (Letendre 2007), which has led to the proposition that exotic raw materials circulated primarily in the form of unifaces, such as endscrapers, during the Woodland period. Evidently, the Early Woodland is excluded from this interpretation, as Meadowood bifaces made of Onondaga chert are present in the region (Provençal 2011; Vidal 2007), and are also present in the Gaudreau assemblage. Though this uniface oriented exchange network seems likely, I would wish to point out that it may also be possible that cores, rather than flakes or unifaces, may have circulated. This form of raw material circulation contrasts with the observed pattern for the Archaic on the Gaudreau site, wherein it is likely that materials circulate as either blanks, semi-complete, or completed bifaces. To an extent, the switch between biface oriented exchange of lithic materials to a uniface (or core) oriented system is likely to have occurred sometime after the Early Woodland period in the region.

5.2 Interpersonal segmentation

Interpersonal segmentation is problematic at a conceptual level; the determining of human-level exchanges requires defining individuals archaeologically and their contributions to the sequences of objects, attempting to go beyond the limitations of the archaeological record itself. In lithics it is more so problematic; lithic technology, including bifacial shaping, predates the human species. The possibilities for technical coincidence and uniformity in applied gestures are compounded with the limited repertoire of techniques at the disposal of knappers (Otte 2003). An example of this effect are the technical similarities present between the Late Archaic types and the Broadpoint types analyzed: As they are all qualitatively large bifaces, shaping of these objects was done from both lateral edges and from the proximal edge, resulting in relatively similar flake patterns. The erasure of shaping patterns by retouch and resharpening may play a role in these similarities, as information is lost through the loss of material. It must also be noted that no two bifaces will ever be identical, due to the randomness of mistakes throughout the sequences, the variation of blank characteristics, and evidently choices in regards to the outline. Although observed patterns of technical choices can be organized as levels of skill to make variation comprehensible and to hierarchize traits to allow the interpretation of discrepancies in skill and therefore a transference between individuals of different skill levels (Crown 2007). Interpretations made under the assumption that the observer's perception of what is proficiency is contextually meaningful lends to the creation of artificial and normative categories of meaning, whereas in context these categories are meaningless for all intents and purposes, as skill in and of itself in its application is a concept lending to the subjective judgement of observable traits (Bamforth and Finlay 2008). By not applying the filter of skill to the analysis of the Gaudreau bifaces, the implied question of "who did what" remains unanswered. Not doing so does however facilitate the examination of choices as part of general preferences within technical systems. For the analyzed bifaces, most differentiation in choices is relatively minor at the assemblage level, with choices generally being binary when sequences are combined. Otherwise, most choices are either discrete choices occurring on a single object, related to the proper application of force (i.e. quality and quantity of step terminations) or the control of the object's volume throughout the sequence (i.e. cross section and longitudinal section). Although objects tend to be unique in regards to choices, i.e. no object presents all the same choices as another, at least some overlap is present between all objects placed within a type. The least variation in choices is present in resharpening, where the most recurrent fork is the ordering of removals, either consecutive or non-consecutive. There is however the coexistence of consecutive and non-consecutive removals on many of the bifaces. This is likely the result of the knapper switching sides and only doing necessary removals step by step instead of placing removals all along edge during retouch or resharpening in a single continuous sequence. Though there is the presence of uncorrected step terminations on many of the examined objects, these mistakes in general do not appear to have affected the overall functionality of the objects, even in cases where major step terminations are present (e.g. BkEu-8.463, BkEu-8.1602). Although the retention of mistakes on a finished piece (e.g. step and hinge terminations) may allow the observation of mistakes made during the process, their retention is more than likely a choice and not a marker of skill. In this regard, their retention may be viewed as purposeful underperformance by the knapper, as the correction of these mistakes may have been viewed as being unnecessary by the individuals using the objects or may have been a means to avoid overcorrection of relatively unimportant characteristics. In the same vein, retouch removals are not necessarily present on the entire edge area on both faces of the pieces, with sometimes only one side per face having been retouched. Patterning seems to suggest that the users favor only doing the removals necessary to rejuvenate the edge or to regularize the edges. The general impression is that users prefer to produce imperfect but functional tools over creating optimally performative or aesthetically pleasing tools. Put differently, the producers and users of tools in this context aim at producing tools that correspond at least minimally to the performative expectations of their project. This aspect is quite present among the NSPT bifaces in the assemblage, wherein cross-sections, longitudinal sections, flaking patterns, and dimensions do not suggest much care was given by the individuals producing these objects. In such a context, especially that of mundane utilitarian objects, there is a relative absence of incentive to produce objects that archaeologists would consider to require a high level of skill to produce (e.g. very large, regular, and thin bifaces). When viewed as such, discrete variations in form outside of the volumetric concept (what we recognize as types) may be a mix of experience and experimentation by creators (Pétrequin 1994). This lack of intent coupled with the acquisition of non-completed forms would also bear upon the initial acquisition of the material, to which there is likely no intent to acquire strictly for exchange purposes. In a certain sense, proficiency in knapping may not matter at all to those having acquired, obtained, and produced the objects observed. With this is mind, the acquisition networks in which the Gaudreau occupants participated within are more than likely primarily general contact and risk-reduction exchange networks rather than resource specific networks. This is also evidenced by the absence of materials from known material-centric exchange networks during the Late Archaic, notably the native copper network originating in the Great Lakes area.

In another case where interpersonal segmentation has been proposed, albeit implicitly, measurements have been used profusely with few technical considerations, with differences discussed as being the result of differing skill levels. In the case of Cross (1990), differences in notch retouching choices was coupled with a relative uniformity of biface measurements to propose a form of specialized production of Mansion Inn-like bifaces for the Turner Farm site. Oddly, Cross chooses to relate the choices made during retouching of the haft elements to levels of skill. Though this position is tenable, as some forms of retouching (e.g. well centered bifacial retouching) may be more complicated to properly undertake, such a notion of skill may prove to be irrelevant in this circumstance as notching techniques (e.g. pressure flaking) are difficult to relate to techniques chosen to shape the biface (ex. Direct percussive techniques)[11] as although both rely on many of the same principals, both sets of techniques have discrete know-hows. In this case the techniques used for notching are relatively simple to master and present a low probability of object failure due to misapplication[12]. This case highlights one of the problems of identifying different levels of skill on a same lithic object.

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[11] Direct and indirect percussive techniques may be used to a certain extent in notching, especially in the case of Perkiomen and Susquehanna Broad types should the proximal section be relatively broad prior to notching (Author's notes, 2014, 2015).
[12] Notwithstanding catastrophic flaws in the piece, the presence of uncorrectable crushed platforms, and other mistakes. Endnote iv provides a case where object failure may occur using pressure flaking techniques.

5.3 Contributions to regional culture history

Although the site does not provide strong contextual information, the presence of certain diagnostic materials does provide some insight into the culture history of southeastern Quebec. For instance, the repeated occupation of the site throughout the majority of the region's prehistory provides a rather large sample of materials linked to the different periods. The presence of Late Paleoindian materials on the site followed by Late Archaic materials, with a seemingly void period in between requires explanation. It should be noted that, although biface producing Middle Archaic sites are present in the region (Corbeil 2007), the Gulf of Maine Archaic tradition is also known in the region (Graillon and Chapdelaine 2015). Due to the contextual constraints of the Gaudreau site, a potential GMAT occupation may be completely invisible archaeologically, due to the non-specific nature of most lithic materials of this tradition. The presence of an abraded stone rod in the assemblage can be evidence of a GMAT occupation, though it should be taken into account that similar objects also appear in Late Archaic assemblages (Bursey 2014). Although there is an intensive use of quartz unifaces in the Gaudreau site assemblage, most of these unifaces may be in fact rather recent and related to the Woodland occupations of the site. Should there in fact have been a GMAT occupation, it likely would have been limited to the Ancient sector of the Upper terrace of the site. At the risk of creating a circular argument, it can be posited that within the confines of the St. François river in Southeastern Quebec the Middle Archaic presents itself primarily in the form of GMAT assemblages. The absence of focused research on the Middle Archaic in this region should however be taken into account, as this interpretation is based primarily upon the presences of the Cascades 5 site in East Angus.

The semi-circular knife found in the Gaudreau site assemblage provides an interesting case for Southeastern Quebec. Few other such knives have been identified, much less published in Quebec in general. Another such knife, from the Ile-aux-Allumettes site, has been published (Clermont 2003), though it bears more similarity to semi-circular knives found in Middle Archaic contexts (Rainey 2005). This may be due to the greater age of the Allumettes semi-circular knife, as it is from an earlier Late Archaic context. As the temporal relations between diagnostic bifaces and polished stone implements is not a one-to-one relationship, it would not be surprising that Middle Archaic style semi-circular knives would persist to some extent into the Late Archaic, much in the same way that polished stone rods occasionally appear in Late Archaic contexts. The Gaudreau semi-circular knife, with its similarities to an out-of-context find in Maine (Rice 1979), is more than likely younger than the one found at Allumettes.

The application of the New York state typology, as developed by Ritchie, and improved upon by others, in the context of Southeastern Quebec is a non-ideal situation, especially upon a site with an uncontrolled context. The typological identifications made within the Gaudreau collection do however remain consistent with the identifications made at a regional level., though it has to be noted that the Vosburg type, as identified in this thesis, has not otherwise been identified in Southeastern Quebec prior to this analysis. At this scale, it is of note that asymmetrical resharpening seems to be rather common for Normanskill type bifaces, as all three bifaces of this type on the Gros-Bouleau site (Corbeil 2007: Fig. 5.7) and 3[13] from the Gaudreau site present this pattern. Extrapolating beyond these two sites for this pattern is hazardous, though it does provide typological questions to be asked at the regional scale. The Chalet site also presents opportunities for examining application of typologies. The few Lamoka type bifaces present on this site (Chapdelaine and Beaulieu 2007: Fig. 6.4) are quite dissimilar from those found on the Gaudreau site, though in both cases the typological interpretations remain in the norm for the type in question (Miroff, et al. 2008; Ritchie 1961, 1980). The Chalet site also presents a few untyped stemmed bifaces, that the authors suggest may be of Terminal Archaic age, based upon radiocarbon dates obtained in association with the bifaces (Chapdelaine and Beaulieu 2007). Though similar bifaces do not occur in its collection, the Gaudreau site presents its own typological conundrum; Many large and narrow concave based bifaces are present in the Gaudreau assemblage, as are many uncompleted bifaces with similar characteristics, all made of the locally available silicified mudstone. Though Graillon (2013) proposes that these bifaces are of Woodland age, as somewhat large Levanna-like biface, they do not seem to fit the

[13] This trait was unobservable for 3 bifaces. The remaining two present symmetrical resharpening.

pattern of production of the other Woodland bifaces in the assemblage. Both the Jack's Reef and Levanna bifaces, when sufficiently complete, appear to be made upon rather small blanks, likely flake blanks, whereas the large triangular bifaces are made upon much larger blanks. Divergences are also evident in the shaping of the bifaces, with the Jack's Reef and Levanna bifaces being shaped in a minimalist fashion, with little intent of producing large removals, focusing primarily on producing the desired outline. In contrast, the large triangular bifaces are fully shaped, with removals aiming both to thin and to produce the desired outline. This differences seem to point either towards the Early Woodland or towards the Archaic period, wherein shaping includes the thinning of the piece and blank choice is less oriented towards the initial thinness of the blank. This typological issue evidently needs to be explored more fully, with controlled contexts, as technological aspects alone does not make a type, nor does it determine the temporal relations of a potential type (Otte 2003).

Conclusion

The Gaudreau site in and of itself provides a contextual challenge (see chapter 2) that creates important limitations in regards to cultural historical interpretations. As such, this analysis does not add significantly to the regional chronology outside of previous publications (see Graillon, et al. 2012). The placement of the site, at a strategic area allowing the circulation between multiple regions, is likely to have been a factor of attraction favorable for the accumulation of the palimpsest. Palimpsests provide long-term information on prehistoric lifeways, in the form of long-term trends rather than the high-resolution that single-occupation and highly stratified contexts provide. Chronological control, being at the heart of archaeological investigation, can be established through the use of typology, all though this approach creates limitations in regards to what materials can be examined. Though differences are present in raw material source regions for the different diagnostic materials on site, it would be hazardous to assume non-critically that said materials were only used during periods for which they appear in diagnostic form, as the bulk of the material on site is non-diagnostic and intermixed. As absence of evidence is not evidence of absence, it was not considered feasible to tackle the problem posed by the uncontrolled context through the assumption that raw materials could be diagnostic of a given period. An approach focused upon single production and curation events, aided through the use of bifacial typology was therefore used to produce a usable sample, although this limited the size of the sample to roughly 30 events. This over-reliance on typology is problematic, as even though dated contexts with diagnostic biface forms are present in the region (Chapdelaine and Beaulieu 2007; Corbeil 2007; Provençal 2011; Vidal 2007), the unquestioned application of typologies elaborated elsewhere creates a semblance of uniformity in material culture between regions prior to the proving of these links. The attribution of types is evidently an “eye of the beholder” exercise, as experience and strictness of adherence varies between observers, which is coupled with the variation within material culture itself.

The analyzed assemblage conforms to the expected regional exchange networks, with the presence of Kineo-Traveller rhyolite, Appalachian cherts, and Onondaga(-like) chert

(Letendre 2007). Although the small sample size and its composition results in the absence of some materials otherwise present on the site, there are few differences between the Archaic materials examined and the assemblage as a whole in terms of raw materials. This great similarity between the palimpsest as a whole and the Archaic occupations does however allow for some nuance, as most raw materials present during the Archaic are otherwise only present in non-diagnostic forms within the assemblage. These non-diagnostic forms, such as endscrapers, are the primary mode of raw material circulation during the Woodland period in the region. As such, the Gaudreau site illustrates the changes in raw material circulation in Southeastern Quebec. Though Kineo-Traveller rhyolite is heavily represented in both the site assemblage and the analyzed sample, its acquisition status remains relatively ambiguous, as either its abundance could be linked to direct acquisition, to greater volumes of exchange between either regions, or the acquisition of relatively large blanks or objects. This ambiguity can be resolved through geochemical fingerprinting, as there is still the possibility that the identified material may be Montagne-de-Marbre rhyolite. An examination of the eastern bound distribution of the locally available silicified mudstone, comparing regional distribution and cut-off distances of both materials, would also be a fruitful approach to understanding the place of green porphyric rhyolites in the region.

Although the interpersonal segmentation of operational sequences may be likely for some of the objects analyzed, strong evidences for this segmentation are lacking. Some of the information gained through this approach does however aid in the interpretation of exchange networks on the site. The recurring convergences in technical choices in shaping does bring the possibility that bifaces made of exogenous materials were obtained by their users in a less terminal form, either as blanks or as less finished bifaces transformed either on site or elsewhere. Evidently, the habitual caveats of shaping sequences still apply wherein the limited spectrum of techniques may result in coincidences and convergences. It is more than likely that bifaces circulated in multiple forms, with some differences in outline potentially attributable to regional variation although such variation would require demonstration. The supplemental information gained through the examination and comparison of the operational sequences of individual objects does however point to a certain uniformity in the Archaic technical systems observable on the site, in this case being that sufficiency is favored over proficiency in the creation of utilitarian objects. It is likely that if atypical and untyped bifaces were to have been considered, this effect may be even more visible. When this is taken into account, coupled with the fact that only completed biface forms were analyzed, no levels of skill could nor should be attributed to the bifaces analyzed. Doing so evidently weakens considerably the argumentation for interpersonal segmentation, as general technical inconsistencies (or consistencies) were instead the focus of the analysis, instead of the classic search for discrepancies in skill. The Gaudreau site's disturbed context evidently adds ambiguity not only to the proper attribution of bifaces, but the association of bifaces between themselves. It begs evidently to question the bifaces that are the most similar, as technical convergence and coincidence are just as likely, as no individual occupations could be singled out

The demonstration of interpersonal segmentation appears to require greater contextual control than that offered by the site examined, however the pairing of bifaces through the examination of technical characteristics bypasses to an extent this requirement. A more diachronic approach to the process of biface production, through the use of refitting, may provide information of better quality not limited to what is observable at the end state of the bifaces. Segmentation would be visible as discrepancies in technical choices, such as shifts in platform preparation, ordering of removals, and shifts in volume control non-relatable to blank characteristics among other things. Such an approach would be necessary to determine moments at which objects go from individual to individual, be it through scaffolding (J. R. Ferguson 2008) or through processes of exchange. The meaningfulness of the form of segmentation with these possibilities in mind would likely be determinable through the contexts and raw materials, wherein the former would be a more likely possibility in the context of a quarry with more experienced individuals allowing less experienced individuals to complete partially shaped bifaces. Such an approach could be tested with the Gaudreau site, for instance through the refitting of flakes with other flakes rather than directly to completed bifaces and verifying that the choices in shaping correspond to the choices observable on the completed bifaces analyzed previously. Doing so would also provide the opportunity to identify similar operational sequences through these non-diagnostic refitted units, allowing other production events to be related to the diagnostic objects. Evidently, technological coincidence should be taken in account should ever this analysis be done.

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End notes

[i] Consider the differences of a tabular blank and of a river cobble. Should both be used for the same project, the percussive techniques used and their ordering will be different. Alternate flaking would likely be used as a first step to produce bifacial edges for the former, whereas the latter would require bipolar flaking to produce usable blanks.

[ii] Sequencing is split between multiple moments during the process, with distinct choices placed in no particular order. The reason for this is that due to the sheer amount of actions (equal to the number of flakes removed) posed during a given bifacial shaping sequence, it is difficult to produce a proper step by step sequence. This is more so the case as only completed objects were analysed, without physical refitting.

[iii] In an attempt to refit flakes upon BkEu-8.3080 (Lamoka biface made of Selkirk or other chert), all bags containing chert from units located in the Central sector were observed. No flakes corresponding to the raw material were observed, and no refits were found. Barring massive object displacement, it is likely that object BkEu-8.3080 was simply rejected on site. It must however be noted that the object was found in a unit adjacent to an area that was screened with 3/8" mesh over ¼" mesh. Should the drop zone of flakes removed from the object have been situated in the area screened with a larger mesh, it is likely that any flakes related to the resharpening or the final shaping of the piece would have been lost during the collection phase, as most removals visible on the biface are the result of flakes having at least one dimension inferior to the length of the diagonal of a ¼" mesh.

[iv] Transverse fractures may easily occur during the use of pressure flaking on relatively thin and narrow bifaces when an excessive load is applied to a difficult or crushed platform and the piece is improperly held. A relatively square flake will also be removed at the point of initiation of the transverse fracture (Author's notes, 2015).