

Analysis of Vertebrate Remains from Site VT-GI-33, Alburgh, Vermont

by Meghan Miele

Abstract

Vertebrate remains recovered from a habitation feature at site VT-GI-33, in Alburgh, Grand Isle County, Vermont, provide a rare opportunity to consider animal use in the northwestern part of the state. The vertebrate remains were excavated from a Late Woodland/Contact period feature at a site located near a large wetland. The collection contains 892 identified vertebrate specimens representing the remains of a minimum of 14 individuals from 12 taxonomic categories. This small, diverse sample yields evidence of a range of aquatic and terrestrial resource use. Although comparative information is rare, data are available from two other Late Woodland sites in the vicinity, the Headquarters site on the Missisquoi River in Swanton and the Bohannon site on Lake Champlain in Alburgh. Data from these three sites help illustrate the importance of vertebrate remains to the reconstruction of Native American subsistence strategies pre-European Contact.

Introduction

The food remains from site VT-GI-33, which returned a calibrated date of AD 1460-1660 (AMS date on maize), were recovered from a very small salvage excavation, but nonetheless provide valuable information to Vermont archaeology, especially due to the typically poor preservation of faunal remains. The lack of faunal preservation and the limited number of thorough studies in Vermont hinder efforts to address issues related to human subsistence behavior and exemplify the difficulty in addressing questions about the nature of prehistoric resources.

Archaeologists from the University of Vermont Consulting Archaeology Program (UVM CAP) and the U.S. Natural Resources Conservation Service (NRCS) conducted a small salvage excavation of a

feature exposed at site VT-GI-33. The salvage resulted in the recovery of a small vertebrate collection, thus providing a rare opportunity to study vertebrate use in northwestern Vermont. Site VT-GI-33 is a Late Woodland/Contact period site located near the Mud Creek State Waterfowl Area (Figure 1). The site was well-situated for people to use wetland, lake and terrestrial resources. Previous research about sites in the area indicates specific patterns of animal use during the Late Woodland period among various cultural groups within the region (Stewart and Cowie 2007; Carder 2003). Archaeologists attribute differences in vertebrate remains among sites to differences in settlement systems, site function and the nature of the immediate local environment (e.g. Stewart and Cowie 2007; Carder 2003). In the following, Late Woodland/Contact patterns of animal use is explored based specifically on site location.

My questions are:

- 1. What vertebrate resources were used at the site? To what extent did the location of the site near a large wetland influence the range of vertebrates captured?*
- 2. Was the site occupied seasonally or was it used repeatedly or continuously throughout the year?*
- 3. Are the characteristics of animal use at the site similar to those of other Late Woodland sites in northwestern Vermont or is site VT-GI-33 unique?*

In the following pages, the results of the vertebrate study are reviewed to address these questions. The first objective is to describe the faunal remains from the small feature recovered from site VT-GI-33. The results from the feature were then compared with vertebrate remains from two contemporaneous village sites in the region: Headquarters on the Missisquoi River in Swanton and Bohannon on Lake Champlain in Alburgh.

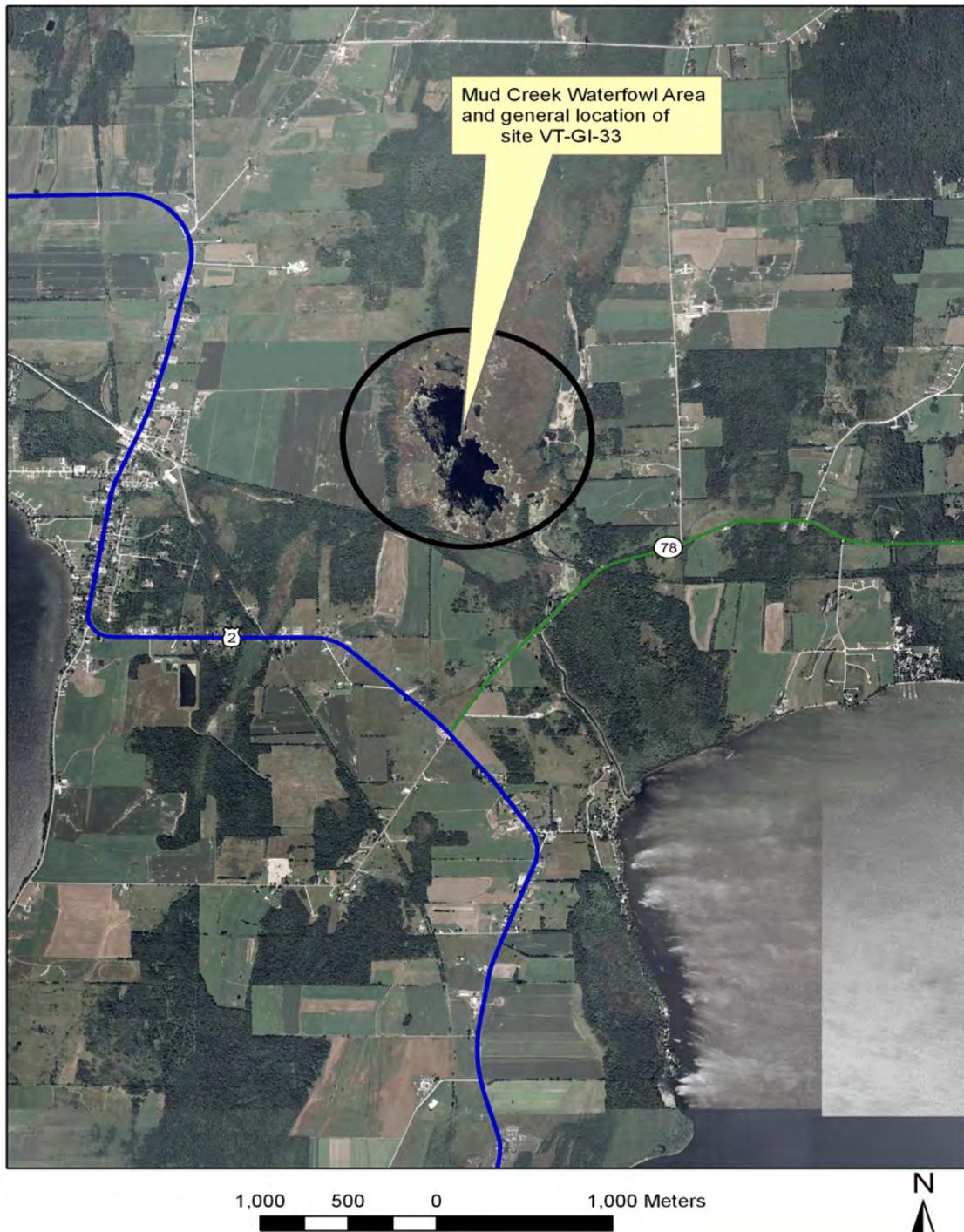


Figure 1. Orthophotograph showing the general location of site VT-GI-33 and the Mud Creek drainage (source: vcgi.org).

Methodology

Site VT-GI-33 was first identified by the land owner in March of 2006. The site is located on a sandy, gravel knoll overlooking the Mud Creek State Waterfowl Area (see Figure 1). Archaeologists from the UVM CAP and NRCS archaeologist David Skinas salvaged a portion of a small feature exposed during exploratory work at the site in September 2006. The work was supported by the UVM CAP and NRCS to help evaluate a site where human burials had been previously identified. Given the sensitive nature of the site and ultimate goals of protection and preservation, no formal systematic excavations were undertaken. The feature studied was exposed during backhoe stripping of topsoil. It was determined in the field to be a hearth and most likely associated with domestic activities based on the obvious presence of fire-cracked rock, plant and animal food remains, and ceramic sherds. Archaeologists brought excavated feature soil to the UVM CAP laboratory and screened all material through 3.2 mm (1/8") mesh.

Based on the limited information available, VT-GI-33 was both a Native American habitation site and cemetery. Its exact dimensions are unknown because no formal excavation of the site occurred. The feature that yielded the vertebrate materials studied was small and basin-shaped. Within the general area where the feature was found, at least seven human burials were identified. In addition to the floral, faunal and lithic material within the feature, it contained pottery sherds and fragments representing a minimum of five vessels. The pottery was stylistically similar to St. Lawrence Iroquoian vessels, based upon a limited examination of diagnostic rim sherds (F. Robinson, personal communication 2007). One lithic artifact recovered from the feature was described as a chopper; at least one lithic flake of an unknown material was recovered from the feature soil as well.

The author examined all vertebrate materials in 2007 using standard zooarchaeological methods (Reitz and Wing 1999) and the comparative skeletal collection of the Zooarchaeology Laboratory, Consulting Archeology Program, University of

Vermont. The Number of Identified Specimens (NISP) was determined. The only exception is the unidentified vertebrate (UID Vertebrate) category, for which specimens were not counted but were weighed. This is an important point when comparing data from other sites as some zooarchaeologists count all unidentified material including fragments that can only be identified as UID Vertebrates. In the interior northeastern United States, preservation is generally poor due to acidic soils. Archaeofaunal collections tend to be composed of 90 percent or higher fragments that can only be identified as UID Vertebrates. When comparing sites, counts of UID Vertebrates were not used in analysis. Bone fragments that cross-mend were counted as single specimens. All specimens were weighed to provide information about the relative importance of the taxonomic categories identified. Identified elements, portion of bone recovered and elemental symmetry were recorded. Bone modifications were noted when present.

Minimum Number of Individuals (MNI) was used to estimate the relative abundance of different taxa in the archaeological sample. MNI was estimated based on paired elements, singly occurring elements and where applicable, size. MNI is estimated for the lowest possible taxonomic level. For the site VT-GI-33 specimens, the lowest taxonomic level identified with confidence was often genus or family.

Although MNI is a standard zooarchaeological measure, it has several problems for archaeological interpretation of resource value to humans. For example, MNI emphasizes small species over large ones demonstrated by a hypothetical sample that consists of fifteen *Perca flavescens* (Yellow perch) and one adult *Odocoileus virginianus* (White-tailed deer). Although fifteen yellow perch is a larger number of individuals, one adult white-tailed deer supplies substantially more meat. If MNI estimates are low, a limited species list frequently results with undue emphasis on one species in relation to others.

Another bias using MNI estimates occurs as some skeletal elements are more identifiable than others. The taxonomic categories represented by these elements may be incorrectly perceived as more

significant to the diet than animals with less distinctive elements. For example, catfish pectoral spines are readily identified, while most other fish spines are difficult to differentiate even as to family. Additionally, a large number of unpaired elements, such as fish vertebrae, often only represent a single individual present in a sample in spite of the large number of vertebrae present. In these cases, the number of individuals for these species may be underestimated.

When assemblage and specimen sizes are particularly small, it can be helpful to divide the unidentified mammal fragments into categories that represent the size of captured animals. For the sample studied, unidentified mammals were divided into the following categories: UID Small Mammal (mammals rabbit-sized and smaller), UID Medium Mammals (mammals' beaver or dog size) and UID Large Mammals (mammals larger than beaver or dog; e.g., deer size). Archaeofaunal specimens identified from the site are summarized by vertebrate class. The summary contrasts the relative abundance of various groups of taxa in the collection. Summary categories are fish, mammals, reptiles, amphibians, and birds.

Modifications to bones reflect activities such as butchering, food preparation, as well as site formation processes. Vertebrate remains recovered from site VT-GI-33 were examined for burning, calcination, staining, rodent gnawing, carnivore activity, butchering marks, and evidence of tool manufacture. Calcined bone may occur if bones are burned intentionally or unintentionally after discard. Calcined specimens are therefore the result of one of two possible processes. Burning at extreme temperatures can cause calcination and this process is usually indicated by blue-gray discoloration. Calcination also occurs by leaching of calcite, but no attempt was made to distinguish between them.

Results

The vertebrate sample from site VT-GI-33 contains 892 specimens and the remains of an estimated 14 individuals representing 12 taxonomic categories (Table 1). The collection weighs 44.14 grams. In

terms of estimated individuals, fish dominate the collection contributing 42 percent of the individuals. The assemblage contains 692 fish fragments weighing 13.12 grams with an estimated minimum of six individuals. In terms of MNI, Ictaluridae (catfish) and *Perca flavescens* (yellow perch) each contribute two individuals, and at least one of the catfish is an *Amerius* spp. (bullhead catfish). *Sander vitreus* (walleye) and a Sparidae (drum) each contribute one individual to the assemblage. In terms of NISP, walleye contribute the most specimens (12) with other fish ranging between three to five NISP. The unidentified ray-finned fish category (UID Actinopterygii) contributes 665 specimens weighing 11.13 grams.

The VT-GI-33 assemblage contained 189 mammal fragments weighing 21.07 grams with an estimated minimum of four individuals (see Table 1). Canidae (dogs/wolves/foxes), *Odocoileus virginianus* (White-tailed deer), *Castor canadensis* (beaver) and Rodentia (gnawing mammal) each contribute one individual. The assemblage contains a radius shaft fragment, which could only be identified to the family Canidae (dogs/wolves/foxes). The lack of a more definitive identification is restricted by the small number of Canidae specimens in the UVM CAP comparative collection and the morphological variation within and between species. In terms of NISP, cervids contribute the most specimens (n=8) with other mammals ranging between one to three NISP. The unidentified mammal categories (UID Mammal, UID Large Mammal, UID Medium Mammal and UID Small Mammal) contribute 176 specimens weighing 14.31 grams. Other vertebrates present in the sample are one unidentified bird, one unidentified Testudines (turtle), one unidentified snake and one *Rana* sp. (frog) individual.

Modifications to the archaeological specimens include burning, calcined bone and carnivore gnawing (Table 2). The specimens recovered from site VT-GI-33 are highly fragmented. Only one specimen is gnawed. Ninety-three percent of the 692 fish specimens are burned or calcined and fifteen percent of mammal specimens are burned or calcined. One bird fragment and one turtle fragment are burned.

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Table 1. Alburgh Site VT-GI-33, Composite List.

Taxa	NISP	Percent NISP	MNI	Percent MNI	Weight (grams)
UID Mammalia	171	19.2			11.51
UID Large Mammalia	3	0.3			1.65
UID Medium Mammalia	1	0.1			1.14
UID Small Mammalia	1	0.1			0.01
Canidae					
Dogs/Wolves/Foxes	1	0.1	1	7.1	2.13
Cervidae					
Deer	5	0.6			0.21
<i>Odocoileus virginianus</i>					
White-tailed deer	3	0.3	1	7.1	4.13
Rodentia					
Gnawing Mammals	2	0.2	1	7.1	0.01
cf. <i>Castor canadensis</i>					
Beaver	1	0.1			0.08
<i>Castor canadensis</i>					
Beaver	1	0.1	1	7.1	0.20
cf. Aves					
Birds	1	0.1			0.19
Aves					
Birds	6	0.7	1	7.1	0.05
cf. Testudines					
Turtles	2	0.2	1	7.1	0.14
Serpentes					
Snakes	1	0.1	1	7.1	0.01
Rana sp.					
Frogs	1	0.1	1	7.1	0.08
UID Actinopterygii					
Ray-finned fish	665	74.6			11.13
Ictaluridae					
Catfish	4	0.5	2	14.3	0.02
<i>Ameiurus</i> sp.					
Catfish	3	0.3	(1)		0.06
<i>Perca flavescens</i>					
Yellow Perch	5	0.6	2	14.3	0.18
Sparidae					
Porgies	3	0.3	1	7.1	0.21
<i>Sander virteus</i>					
Walleye	12	1.4	1	7.1	1.52
UID Vertebrate					9.48
Total	892		14		44.14

Table 2: Alburgh Site VT-GI-33, Modifications.

Taxa	Percent Burned	Percent Calcined	Percent Punctured
UID Mammalia	1.1	13.9	0.1
UID Large Mammalia	0.2		
UID Small Mammalia		0.1	
Cervidae			
Deer		0.1	
Aves			
Birds	0.1		
cf. Testudines			
Turtles	0.1		
UID Actinopteygii			
Ray-finned Fish	6.7	86.2	
Ictaluridae			
Catfish		0.1	
<i>Perca flavescens</i>			
Yellow Perch	0.1		
<i>Sander vitreus</i>			
Walleye		0.1	
Total Number of Specimens in Sample	892		

Discussion

What vertebrate resources were used at site VT-GI-33? To what extent did the location of the site immediately adjacent to a large wetland influence the range of vertebrates captured? Was the site occupied seasonally or was it used repeatedly or continuously throughout the year?

The faunal remains identified represent a range of terrestrial and aquatic vertebrates. Fish present in the assemblage are most commonly encountered in fresh water lakes and ponds. Predominance of fish in the VT-GI-33 archaeological collection probably reflects proximity of the site to the creek/wetland, as the environment in the proximate area around a site influences choices concerning the types and extent of the habitats exploited. It is important to note the

differences between wetland habitats versus a lakeshore habitat. Lakeshores are open, highly traveled areas and they allow easy access to deep-water fish. Wetlands are typically more inland; they encounter limited travel, are high in vegetation (i.e. grains), and they are abundant in small, medium, and large animals. While none of the fish supply direct evidence of season of occupation, we expect they may indicate a warm weather occupation. Brown bullheads and yellow perch spawn during late spring or summer but may be found year-round in heavy vegetated bays, or weeded shallow lake or lake edges (Lee et al. 1980).

Are the characteristics of animal use at the site similar to those of other Late Woodland sites in northeastern Vermont or is the site unique?

Analysis of Vertebrate Remains from Site VT-GI-33, Alburgh

Two archaeological sites located in the near region contain deposits that are temporally similar (Late Woodland) to those recovered from site VT-GI-33. One assemblage is from the Headquarters site in Swanton (VT-FR-318; Stewart and Cowie 2007). The second assemblage is from the Bohannon site in Alburgh (VT-GI-26; Carder 2003) (Figure 2). It would be preferable to have a larger sample from VT-GI-33 to compare to the larger samples from the other sites but due to the unique circumstances, this is not possible.

The Headquarters site is located on the south side of the Missisquoi River and north of Maquam and Black Creeks in Swanton. All rivers drain into Lake Champlain. The archeological record at this site includes Middle Archaic through Late Woodland Period deposits, with little evidence of Contact period material. The site had become a large, semi-permanent settlement with “Iroquois like” ceramic assemblages by the Late Woodland Period (Stewart and Cowie 2007). The Headquarters faunal assemblage was recovered by University of Maine, Farmington, in 1999 and 2000. The Headquarters site vertebrate materials were recovered with 6.4 mm mesh in the field, and most analyzed materials were recovered through flotation from Late Woodland period feature deposits. The collection contains

2,490 identified specimens (Table 3) (Stewart and Cowie 2007). MNI was not calculated for this assemblage.

The Bohannon site is a Late Woodland period site located in Alburgh. The site is located on a wide floodplain within 100 m of the western shore of Missisquoi Bay. The local environment is the lake shore. Floral remains from the Bohannon site indicate that the immediate environment consisted of a beech-sugar maple-birch forest community at the time of the St. Lawrence Iroquoian occupations (Asch Sidell 2002 in Carder 2003). The Bohannon vertebrate assemblage used for comparison here is from two features dating to the Late Woodland period (Carder 2003). The Bohannon vertebrate materials were recovered with 6.4 mm and 3.2 mm mesh by the UVM CAP. The Bohannon assemblage used for comparison contains 981 specimens representing the remains of an estimated 33 vertebrate individuals (Table 4).

In the following discussion, the Krebs index of similarity is employed to compare use of vertebrates using NISP from the three sites. Normally, zooarchaeologists would use MNI or biomass as a more representative measure; however, due to small sample sizes and lack of MNI for the Headquarters site, the number of identified specimens (NISP) is

Table 3 . Vertebrate Remains from the Headquarters Site, VT-FR-318 (adopted from Stewart and Cowie 2007, Table 3. UID Vertebrates and shellfish excluded from comparison; for the purposes of this table, all percentages were recalculated excluding these classes).

Class	Number of Identified Specimens (NISP)	Percent of 2,490
Osteichthyes (bony fish)	1,439	57.8
Mammalia (mammals)	1,024	41.1
Reptilia (turtles)	25	1.0
Aves (birds)	2	0.08
Totals	2,490	99.98



Figure 2. USGS map showing the general locations of site VT-GI-33 and the Bohannon and Headquarters sites in northwestern Vermont (source: vegi.org).

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Table 4. Bohannon Vertebrate Summary Table (from Carder 2003).

	No. of NISP	Percent NISP	Weight (grams)	Percent Weight	No. of MINI	Percent MINI
Fish	246	25.1	2.63	0.86	8	24.2
Amphibian	1	0.1	0.01	0.003	1	3.0
Reptile	2	0.2	0.02	0.006	2	6.1
Mammal	714	72.8	300.06	98.53	20	60.6
Bird	18	1.8	1.81	0.59	2	6.1
Total	981		304.53		33	

Table 5. Percent NISP Similarity.

	VT-GI-33		Bohannon		Headquarters	
	<u>NISP</u>	Percent <u>NISP</u>	<u>NISP</u>	Percent <u>NISP</u>	<u>NISP</u>	Percent <u>NISP</u>
Fish	692	77.6	246	25.1	1,439	57.8
Amphibians	1	0.1	1	0.1	0	0.0
Reptiles	3	0.3	2	0.2	25	1.0
Mammals	189	21.2	714	72.8	1,024	41.1
Birds	7	0.8	18	1.8	2	0.08
Total	892		981		2,490	

Percent Similarity between VT-GI-33 and Bohannon:

$25.1 + 0.1 + 0.2 + 21.2 + 0.8 = 47.4$ percent

Percent Similarity between Bohannon and Headquarters:

$25.1 + 0 + 0.2 + 41.1 + 0.08 = 66.48$ percent

Percent Similarity between VT-GI-33 and Headquarters:

$57.8 + 0 + 0.34 + 21.2 + 0.08 = 79.42$ percent

used. Krebs's index is a quantitative similarity coefficient that is little affected by sample sizes of 100 – 5,000 (Krebs 1989:294-305, Reitz and Wing 1999:107-108). Table 5 compares the percent similarity NISP of each taxonomic group for VT-GI-33, Bohannon, and Headquarters.

The proportional value calculated from vertebrate class from the three samples ranges from 47 to over 79% similarity between samples by NISP (Table 5). NISP percent similarities indicate site VT-GI-33 and Headquarters are most similar at 79 percent. High values indicate that similar resources in similar frequencies were exploited by the occupants of the three sites.

There are a few notable differences in which vertebrate class and taxa within vertebrate class were more heavily exploited between the three sites. The faunal sample from Bohannon differs from the other samples in the greater relative abundance of mammals (Table 5 and Figure 3). Mammals represent 21 percent of the sample NISP from Alburgh and 41 percent of Headquarters, but represent 73 percent of the Bohannon sample. The greater relative abundance of mammals from Bohannon may result from sampling bias, but may also indicate vertebrate resource seasonal availability or different site functions (Carder 2003).

The vertebrate sample from Alburgh has the greatest relative abundance of fish (78 percent of the sample NISP) compared to 58 percent from the Headquarters sample and 25 percent of the Bohannon sample. Percent NISP is also graphed to show similarities between Alburgh and Headquarters and the inverse proportionality of Bohannon (see Figure 3). When we look at the sites in terms of MNI, site VT-GI-33 and Bohannon also inversely differ in use of fish and mammals (Figure 4).

Results indicate animal use is most similar between VT-GI-33 and the Headquarters site. This is suggested due to the sites' locations immediately adjacent to large wetlands and creeks/rivers rather than open lakeshore. The predominance of fish in the VT-GI-33 and Headquarters' archaeological collections probably reflects the proximity of the

sites to the Mud Creek drainage and associated wetlands in the case of VT-GI-33 and the Missisquoi River, Maquam and Black Creeks and associated wetlands in the case of the Headquarters site. Season of occupation may also have been a factor in the observed differences between the three sites. Carder explored the possibility that Bohannon could have been a late fall/winter habitation based on vertebrate remains recovered (Carder 2003). If this is true it may further explain the differences between these assemblages. If Bohannon was a site for groups in the fall/winter, it may explain the larger relative frequency of mammal remains; not only for meat purposes but for the use of their skins as well. If VT-GI-33 and the Headquarters sites were occupied during the summer months, or even year-round, we would expect a large representation of fish remains in deposits due to site location and warm weather access to fish.

Conclusions

The vertebrate archaeofaunal collection from site VT-GI-33 is relatively small, but it contains a range of aquatic and terrestrial fauna. When these remains are compared to faunal deposits from the two contemporaneous Vermont sites near by, fish are, by comparison, most abundant at site VT-GI-33. The site is most similar to the Headquarters site and least similar to the Bohannon site. Differences are likely related to site location: VT-GI-33 and the Headquarters site are both located immediately adjacent to drainages and large wetlands while Bohannon is located along open lakeshore. Differences between the collections may also indicate methodological biases, however, or different vertebrate harvesting strategies based on season of occupation, economic decisions, technology, preferred foods, or even social distinctions between the sites. Future research questions should focus upon which of these factors or others are responsible for the observed differences in vertebrate exploitive strategies from the three sites.

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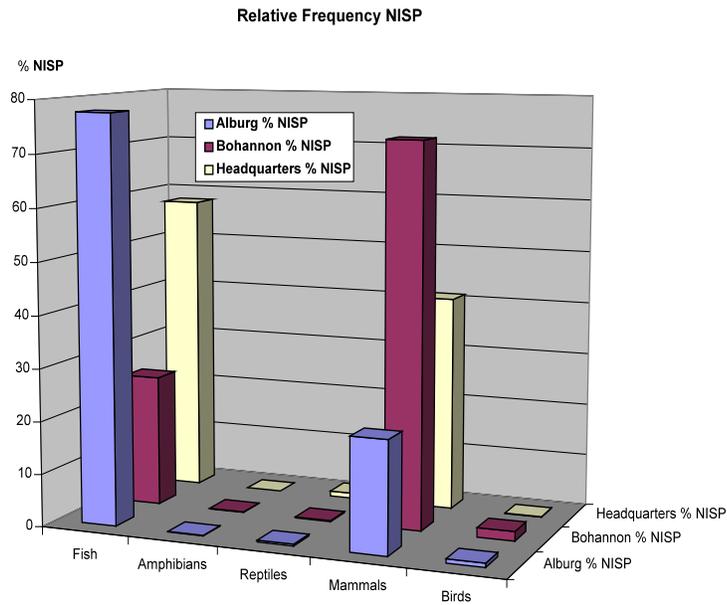


Figure 3. Bar graph showing the relative frequency NISP between VT-GI-33 (“Alburg”), and the Bohannon and Headquarters sites.

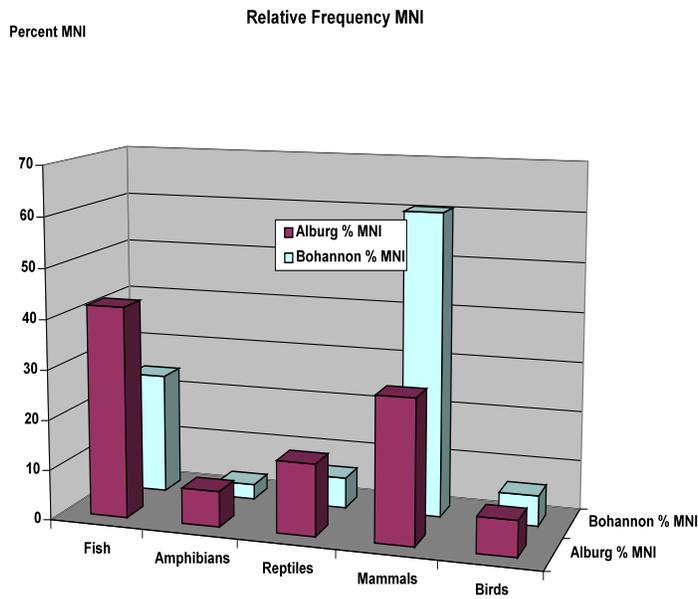


Figure 4. Bar graph showing the relative frequency MNI from VT-GI-33 (“Alburg”) and the Bohannon site.

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