Visualizing the "Somewheres": Using GIS to Create Landscapes Encompassing Clusters of Upland Sites in Hinesburg, Vermont

Niels R. Rinehart

"The Sharanahua say, 'We are at Marcos', long before the houses are in sight since the beaches, the river, the streams, lakes, and forest are as much a part of the village as the houses that shelter people" (Siskind 1973:29).

Introduction

Several years ago I conducted background research for a proposed power line running from eastern New York across Lake Champlain and into western Vermont. I worked through reports and site forms for hundreds of sites on the Vermont side of the project, most of which had produced only a handful of artifacts. What struck me was the high number of small and seemingly insignificant sites clustered about the landscape. I became frustrated with the confusing stack of forms representing these numerous dots of small sites, and wondered what anthropological sense any of this made. Cultural resource archaeology is based on the management of documented things including cultural features and artifacts that we can delineate with boundaries to create archaeological sites. By bounding where we find artifacts, we create discrete entities, enabling the important tasks of management and mitigation in the face of development. In short, the presence versus the absence of artifacts and features defines the archaeological landscape, creating a binary understanding of how past peoples lived across the surface of the planet. But this archaeological structuring of the landscape can detract from our ability to think about the spaces in which people once lived (Al Dekin, personal communication). This paper was created through an exercise to see how I might identify clusters of sites and visualize these site clusters as coherent wholes across the landscape. In short, the goal of this exercise was to take a cluster of many small sites and identify ways to possibly visualize the cluster together as a single larger destination.

When seen individually, it would be hard to argue that each of these small sites have much significance. In much the same way as a single flake, lithic tool, or pot sherd can have limited research potential, these small sites become important when they are understood as contributing to a greater whole. Through understanding each of these sites within larger contexts, arguments can be made for their collective significance as thematic or property districts (Versaggi and Hohman 2008). Sites form our basic spatial building blocks in defining people's relationship with their landscape. Since we define space through the site boundaries and site types that we create, reworking our spatial conception of sites can help us to form new building blocks and therefore build new interpretations of past landscapes.

Landscape

The concept of landscape continues to defy a clear definition and some have accused archaeologists of creating landscapes that are little more than space populated by bounded distributions of artifacts (Knapp and Ashmore 1999:1; Savage 1990:330). But over the last few decades, many social scientists have understood that landscape is socially constructed and subjectively experienced, defining landscape as the medium and the outcome of social practices (Savage

1990:339). The concept of landscape lies within a continuum between conceptual and constructed, cultural and natural (Knapp and Ashmore 1999), such that space can be seen as de-quantified, social, and qualitative, as well as economic and geometric (Witcher 1999:13).

In discussing the concept of landscape in archaeology, Crumley and Marquardt (1990:77) compare the archaeologist to a traveler. As the traveler goes through the landscape, he or she is concerned with the larger picture and the broader journey. For the traveler, the landscape is full of "nowheres" that lie between the "somewheres" they are interested in. For the local on the other hand, the "nowheres" are the "somewheres", thanks to a lifetime of lived experiences. In the context of my interest in these many clusters of rather non-descript upland sites, how can we define and illustrate the larger destinations that formed these landscapes and their past "somewheres"? And then how can we connect them within a larger network?

The Use of GIS in Landscape Archaeology

My goal has been to make the obvious a little more obvious by seeing if I can construct a GIS as a qualitative tool to visualize clusters of sites as single landscapes. Through visualizing landscapes that encompass site clusters, we can understand them as single destinations, or rather "somewheres", as opposed to a map illustrating where artifacts were found and understood through the use of discrete archaeological sites. Two fundamental problems face the use of GIS in archaeology. GIS portrays space in ways that are abstract and quantitative, resulting in a conflict with more recent conceptions of landscape that are qualitative and subjective (Witcher 1999). The other problem also stems from the use of the map metaphor. Maps are excellent for illustrating and analyzing form, but they remain static, abstracting space from time and treating each as an independent variable. (Ebert 2004:334; Goodchild 2004:712; Mark 2005:10; Witcher 1999:14).

Research in GIS and landscape studies have arisen over the last several years addressing these issues, based on the idea of getting the viewer to experience the landscape from within. The goal has been to "locate us in alternative realities" by moving us away from the more top-down specular landscape of the distribution map (Witcher 1999:15). Chris Tilley (1994:13) writes about the concept of the being or the body within the landscape. We perceive the world through the body and it is through the body that we mediate between the mind within, and the world without. In short, the goal becomes to create a GIS that might re-create the physical presence within the landscape of the past, by making the body the point of contact within the landscape. Today there are scholars across several disciplines exploring subjective geographies through the representation of qualitative or "fuzzy" data (Cooper and Gregory 2011:89). Under various research banners including spatial humanities and cognitive mapping, these scholars are using GIS as a qualitative tool by "embedding the practice of digital map-making within the interpretative process" (Cooper and Gregory 2011).

Although the sites I used in the study produced little to no temporal data, I am assuming temporal continuity rather than looking for discontinuity in reviewing these sites. My belief is that if the assemblages within the presumed landscape are similar, then that similarity illustrates similar repeated uses of that landscape over an indeterminate period of time. Following the traveler analogy discussed before, the local understands the advantages far more intimately than the traveler and therefore returns to a particular destination. It is through this continued use that a landscape becomes meaningfully constructed, creating what others have called "habitual use areas" (Barrett 1991:8, Savage 1990:335; Wobst 1974:153).

Creation of the GIS

When I began this project, I selected the towns of Williston, Hinesburg, and Colchester from the numerous towns the proposed pipeline would have passed through, reviewing over 200 sites from the combined site files of these three towns. But for the purposes of this paper, I reduced my scope to sites identified within the town of Hinesburg (Figure 1).

The first task was to determine if the sites were clustered and if that clustering was statistically significant. To test for significance, I conducted a Nearest Neighbor Analysis, first on all the sites identified within Hinesburg, and then on the remaining sites after I removed those sites that did not appear to be part of identifiable clusters. The results indicated a statistically significant clustering of sites within Hinesburg (Figure 2).

The next task was to determine if the assemblages produced from each of these sites identified within the clusters were similar. Similar assemblages might mean a continuity of landscape use over an indeterminate period of time. Difference in the assemblages might indicate that the sites were different destinations used in different ways, maybe seasonally or playing different roles in how people moved about the landscape over the course of hundreds or thousands of years. To test for this similarity, I compared artifact density and artifact richness. Data were available for 22 of the sites within Hinesburg, 10 shovel-tested and 12 surface-collected. The comparisons were not particularly satisfactory, in part because the data were very sparse and rough-grained, and as discussed below, the identified patterns appear to be taphonomic, reflecting differences in testing strategies (Figure 3). Shovel-tested sites produced higher artifact densities, probably because these sites cover smaller areas and excavating and screening recovered more artifacts than were found through surface collecting. There are two exceptions, most notably Site VT-CH-399, a large site that was surface-collected producing over 4,000 artifacts. The average assemblage size for the other sites is 15, ranging between one and 63 artifacts.

Comparing sites by richness also proved to be problematic, in part because the possible variation was so slight since so few artifact types were identified (Figures 4 and 5). The lack of variation might well represent the lack of diversity characteristic of sites resulting from brief occupations (Andrefsky 1998; Nelson 1991), with the highest richness (n = 7) identified for VT-CH-399, the site producing over 4,000 artifacts. However, the richness results may also illustrate the relationship between investigation techniques and the resulting assemblages. The lower levels of assemblage richness from the excavated sites versus the collected sites might reflect our tendency to identify the larger and more varied (meaning more interesting) artifact types during surface collections, while we find more flakes while screening. So the comparisons were not particularly illuminating, except to illustrate some broad differences, particularly between Site VT-CH-399 and the other sites.

Through the use of a GIS, my goal was to layer different characteristics that together might be used to demarcate the landscapes that may have once encapsulated these site clusters. GIS is ideal for the iterative process involved in going back and forth between the different characteristics, looking for commonalities. Through this process, I hoped to create "somewheres" out of the clusters of disparate sites that people in the past might have once understood.

Sites VT-CH-408, -409, -410, -44, -103

Sites VT-CH-408, -409, -410 are typical of the numerous clustered upland sites across western Vermont that I reviewed during background research for this project. Excavations recovered 13 artifacts in shovel tests between the three sites, including chert, quartz, and quartzite flakes, as well as a projectile point fragment and a uniface. No data were available for sites VT-CH-44 and -103 besides their locations.

I began with looking at the viewshed. Ebert (2004:330) writes that in visualization analysis, we can approach the gap between current data and past cognitive landscapes through the construction and interpretation of viewsheds. If a destination was understood as a single spatial entity, than that destination, or landscape, could be what was physically visible within a single viewshed. If the landscape was a coherent whole, then presumably you could stand at any one point within it and see the whole. In constructing the viewsheds, I assumed a height of 2 meters (about 6 and a half feet) for the viewer. The construction of viewsheds can be problematic however, since its application assumes a clear landscape. However, a function of viewshed analysis in this case was also to identify what could not be seen, as opposed to what the GIS says could be seen, since I was trying

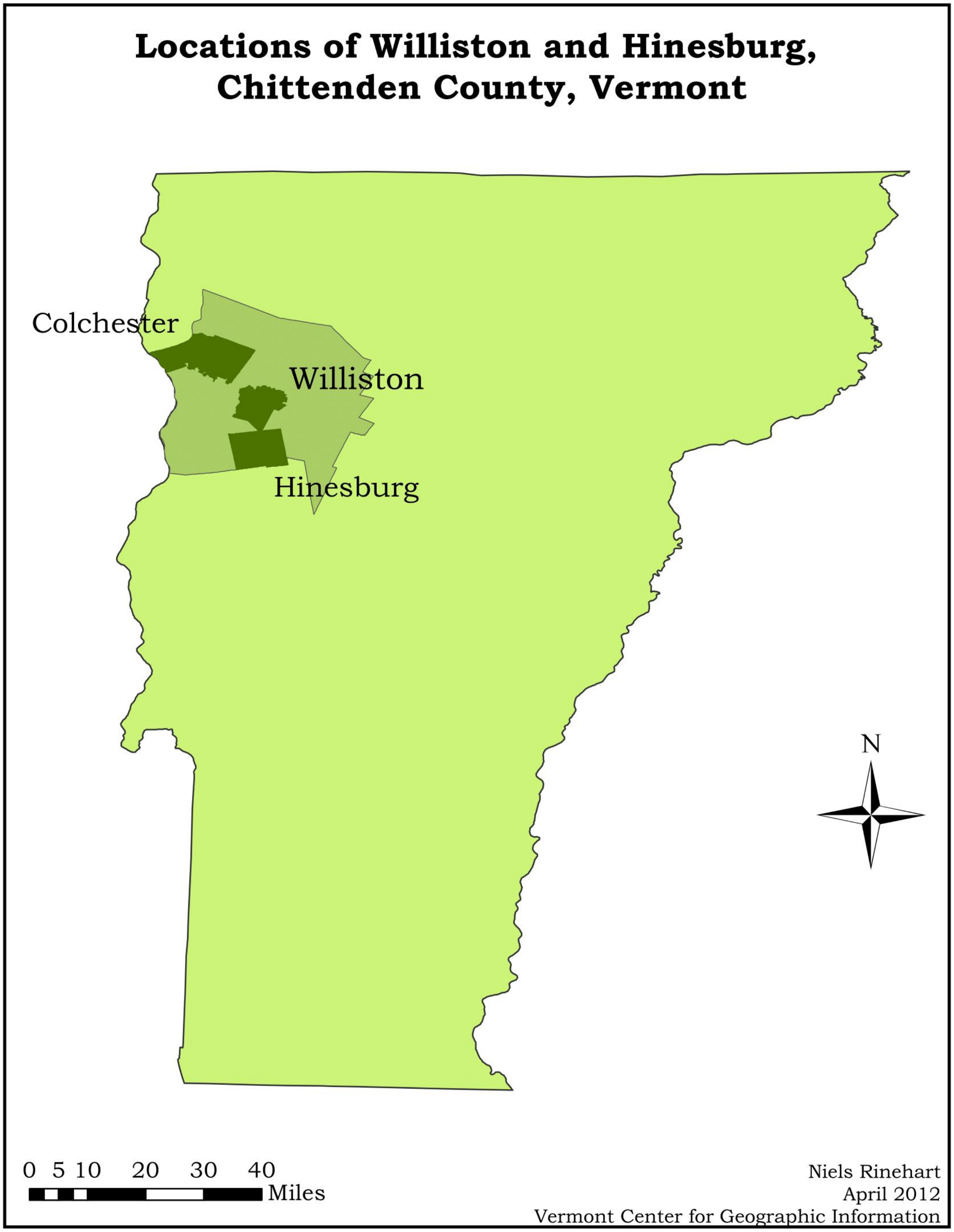

Figure 1. *Locations of Williston and Hinesburg, Chittenden County, Vermont*

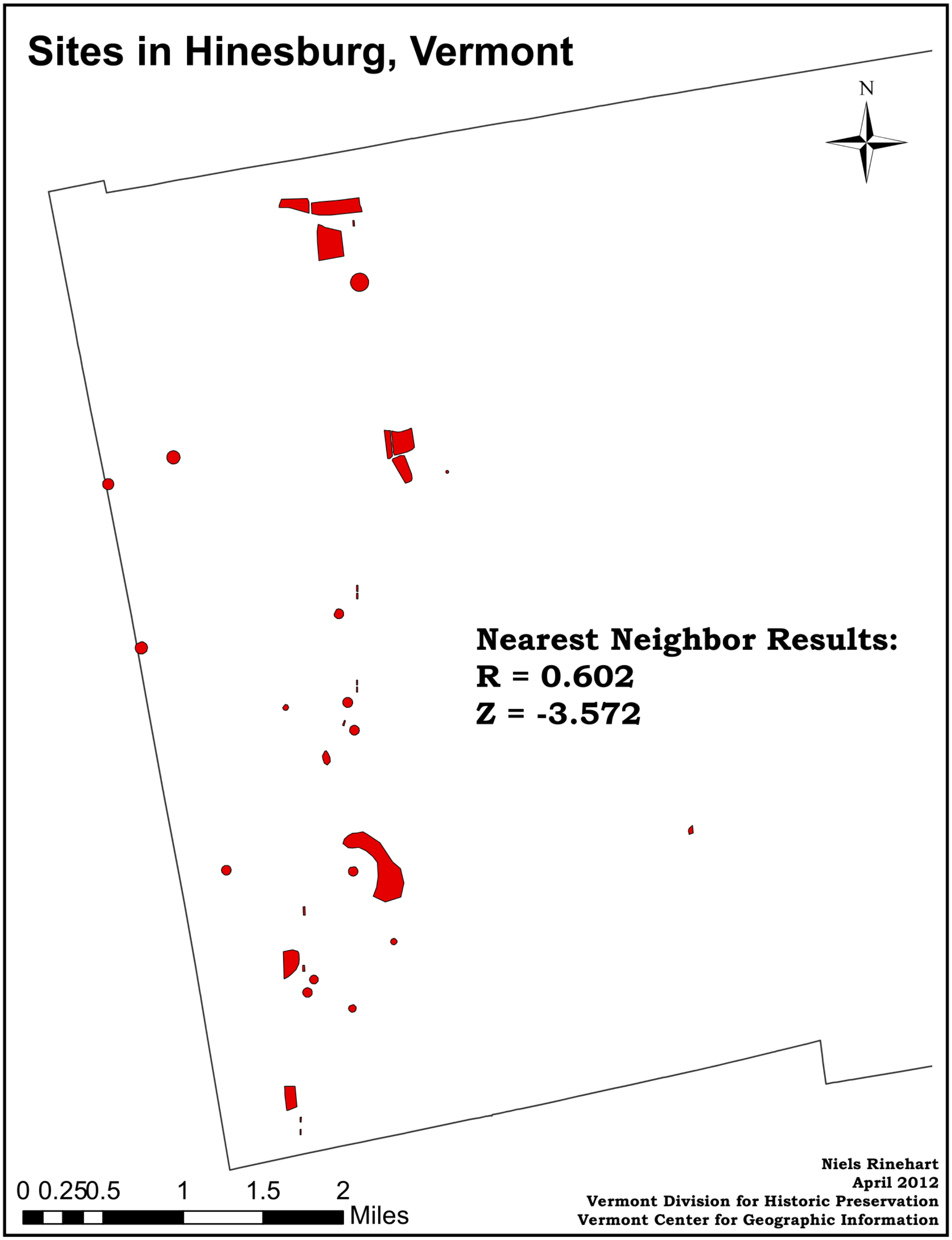

Figure 2. *Sites in Hinesburg, Vermont*

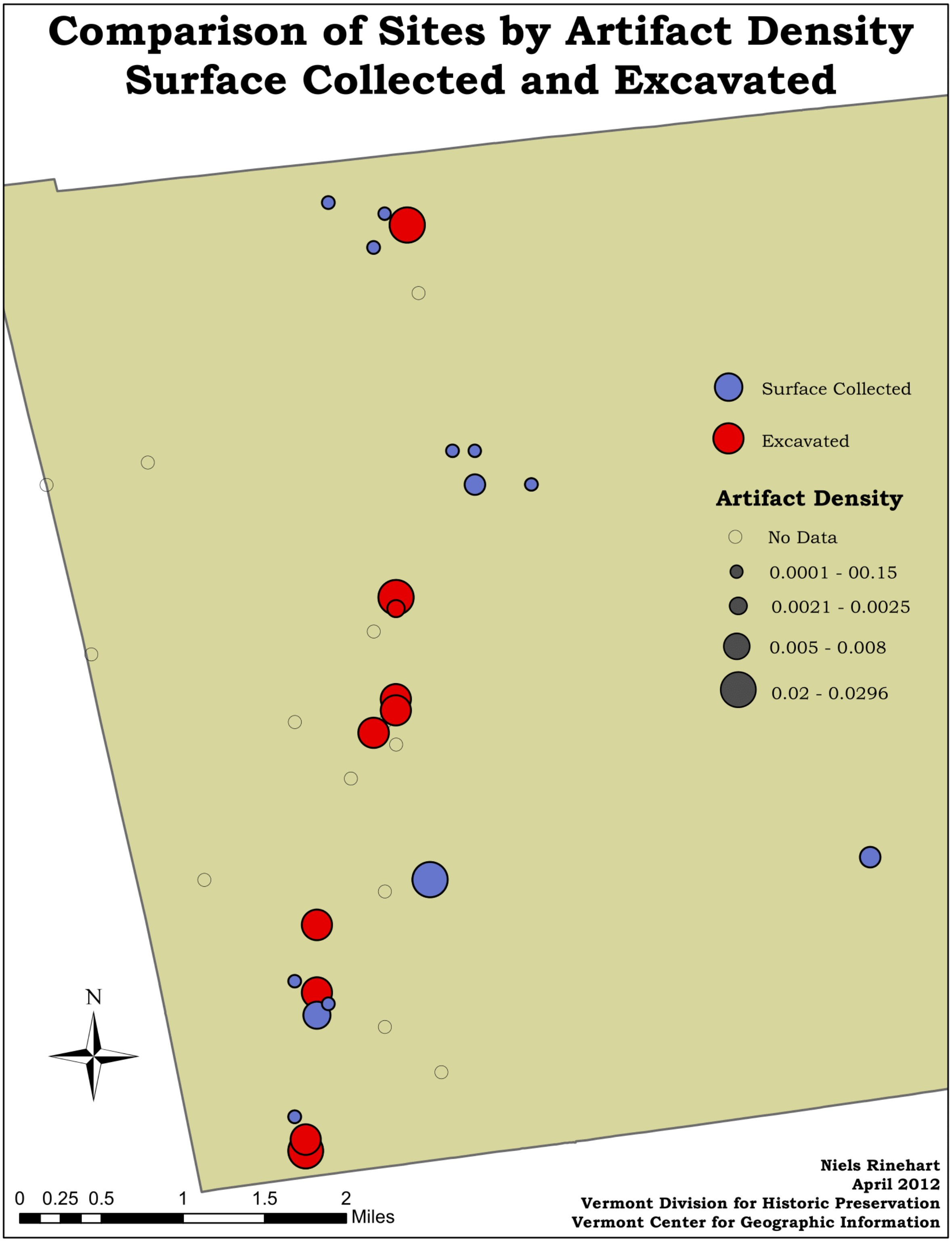

Figure 3. *Comparison of sites by artifact density, surface collected and excavated*

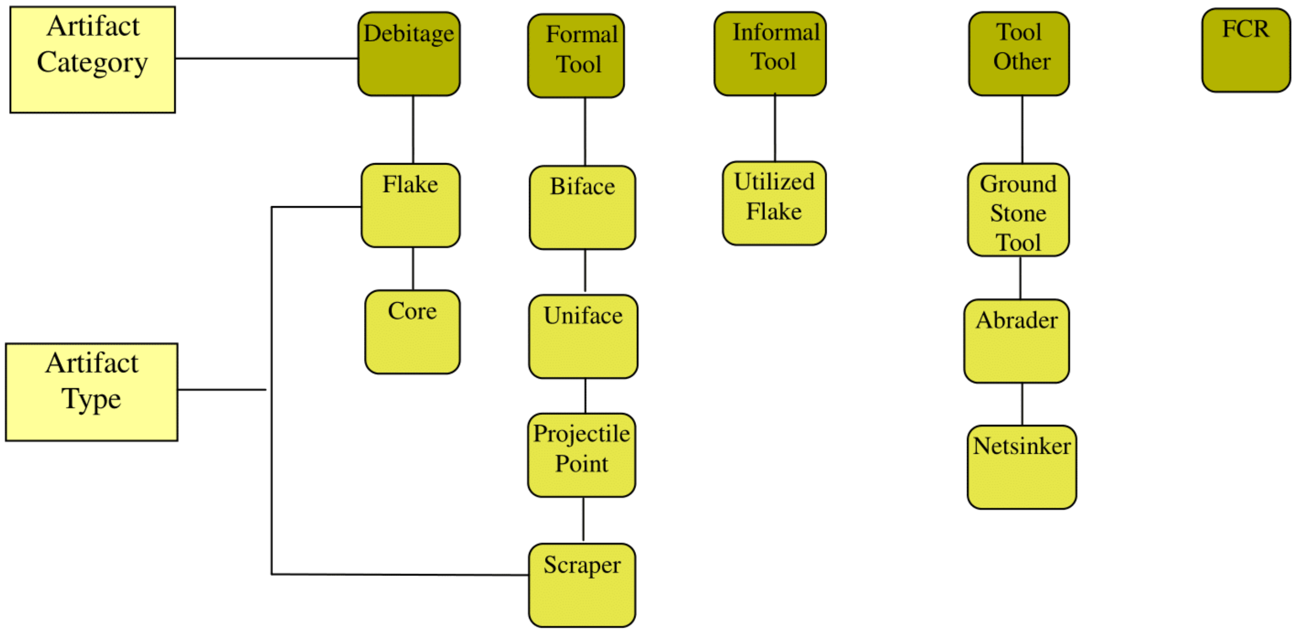

Figure 4. *Artifact Typology*

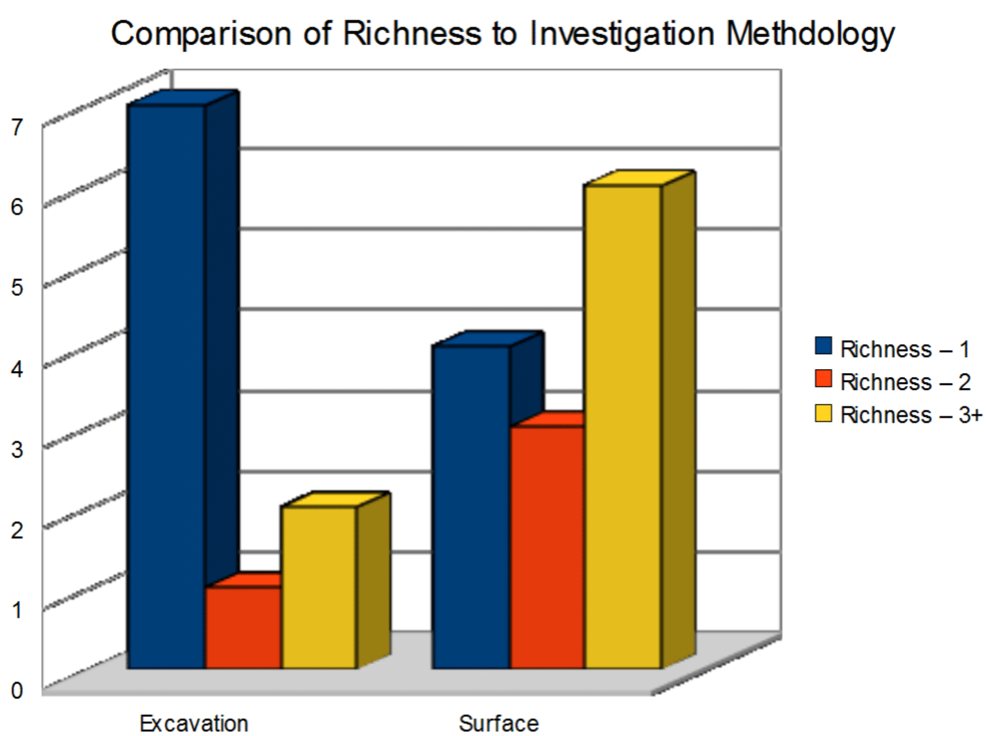

Figure 5. *Comparison of Richness to Investigation Methodology*

to find ways to bound what might be considered a part, as well as outside, of a coherent whole.

The viewsheds from Sites VT-CH-408, -409, and -410 overlap each other, indicating that the different sites are visible from each of the sites, as well as Sites VT-CH-44 and -103. This over-lapping may provide evidence for the idea of a coherent landscape, based on the assumption that people would be more likely to conceive of a landscape as a coherent whole, if they could see the whole from points identified within it (Figure 6).

I then placed the slope layer over-top of the viewsheds to create boundaries. The east boundary follows where the viewshed and the level ground runs along the western edge of the slope. To the north, I created a boundary along the ravine. The viewshed extends across the ravine, but the ravine forms a natural boundary, and steep slopes ring its northern side. I bounded the western edge along the wetlands and steep slopes, although there is a level area directly west of the wetlands that might well be part of the cluster (Figure 7).

The western side receives the sun's light from the southeast/east where the cluster presumably continues to encompass sites VT-CH-103, -44, and -410 (Figure 8). Steep slopes bound the western portion of the cluster. The southern boundary opens-up slightly between the slopes to the west and the pond and wetlands to the south, to leave a small opening that would have led to Site VT-CH-399 about one kilometer to the south. As stated previously, Site VT-CH-399 is the largest known site in the area, producing a dense and rich artifact assemblage. The southeastern boundary of this cluster is more nebulous. Although the viewshed is blocked by a slight rise, the ground is level up to the north bank of the pond. However, according to the drainage map, this land is poorly drained, but I am uncertain about the efficacy of soil drainage as a factor in a state where snow covers frozen ground for almost six months of the year.

This brief review covers a large and varied landscape of 43 acres. It becomes apparent that in looking over a roughly 10-kilometer stretch running north-to-south along the western half of Hinesburg, that there are approximately five similar clusters of over two-dozen registered sites (Figure 9). These clusters are similarly bounded by slopes and overlapping viewsheds, and can be connected by level ground openings.

I am not proposing that we should expect to find artifacts across the 43 acres encompassing Sites VT-CH-408, -409, and -410 that I have outlined, and that we should dig holes accordingly. Identifying more artifacts is not the point. Rather, as stated previously, my goal here was to make the obvious a little more obvious, to see beyond the numerous seemingly insignificant small sites and visualize the possible "somewheres" as people in the past might have seen them. There is no archaeological reason for there to be so many sites and site forms and it is in part through our creation of these bounded entities that we have trouble understanding the potential research significance of these finds (Versaggi and Hohman 2008).

Although the maps are static, the hope is to create a more interactive relationship with the landscape, encouraging the user's interpretation. My hope is to present the user with the opportunity to explore the possible routes through the landscape, entering into these different site clusters or destinations. Through placing people within an actual landscape that we can see and know, we might be better able to communicate the past to a wider public. Following a quote by Franco Moretti (Moretti 1998:7, in Cooper and Gregory 2011:106), after making the map "begins in fact the most challenging part of the whole enterprise: one looks at the map, and thinks."

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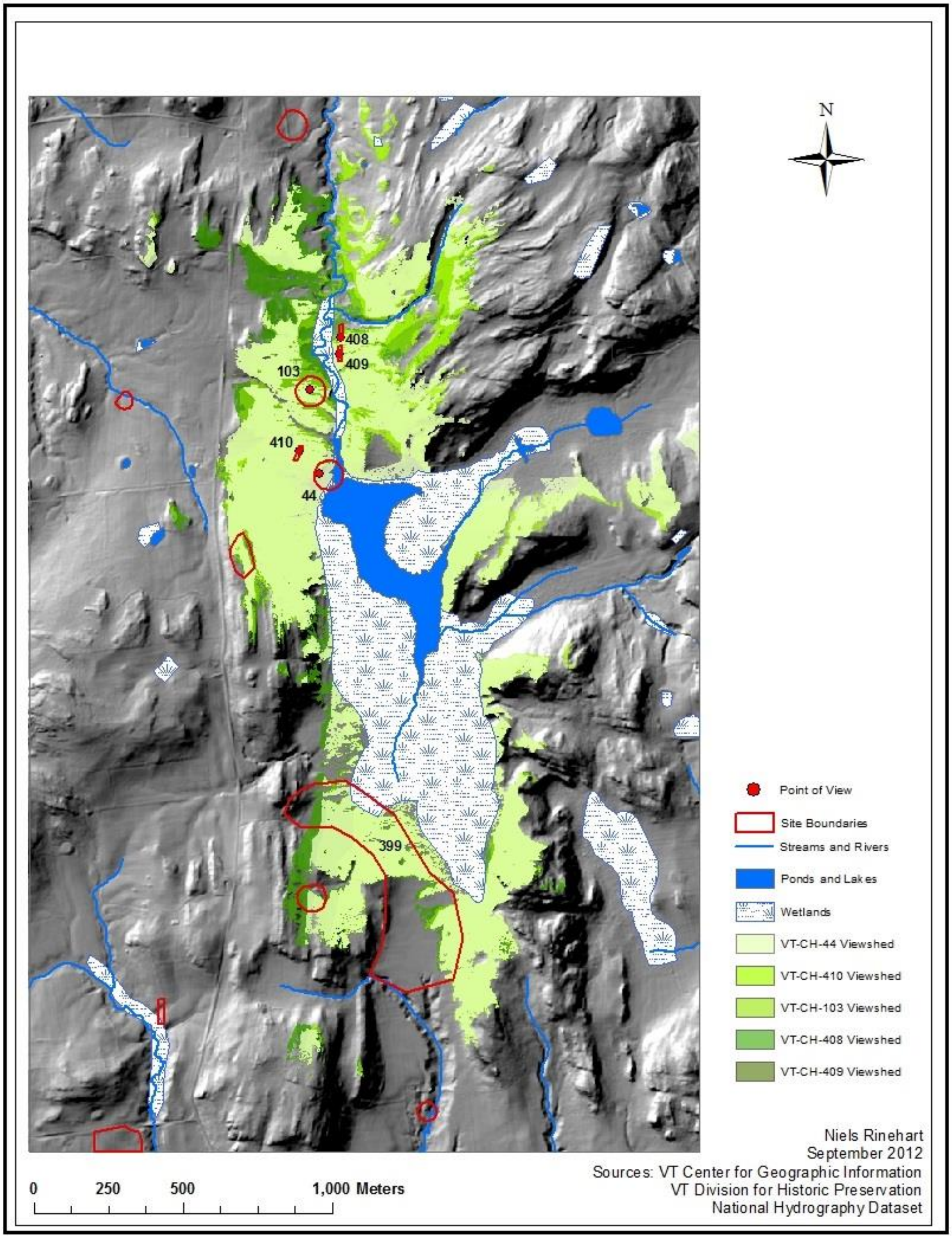

Figure 6. *Viewsheds across sites VT-CH-44, -103, -408, -409, and –410*

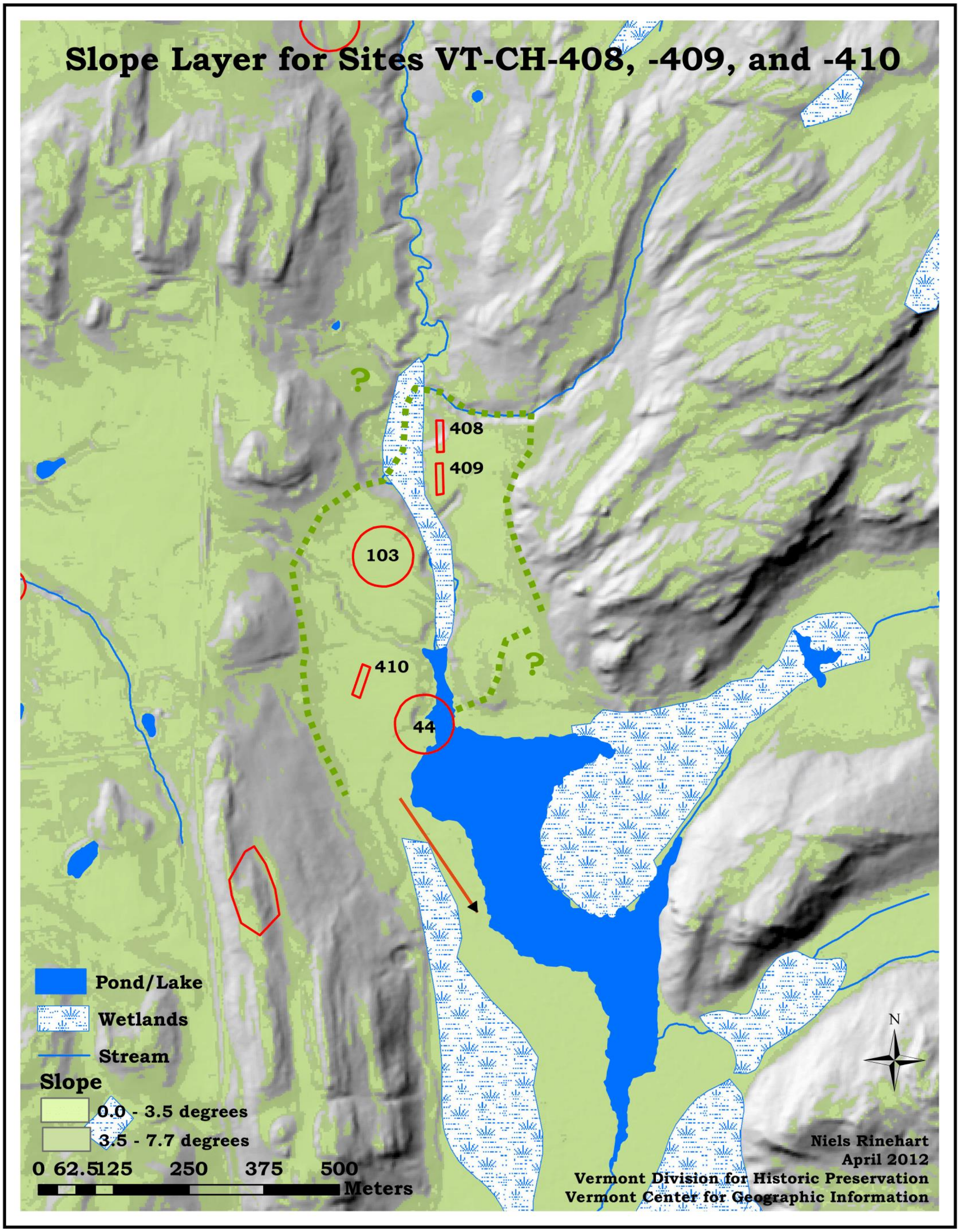

Figure 7. *Slope layer for sites VT-CH-408, -409, and –410*

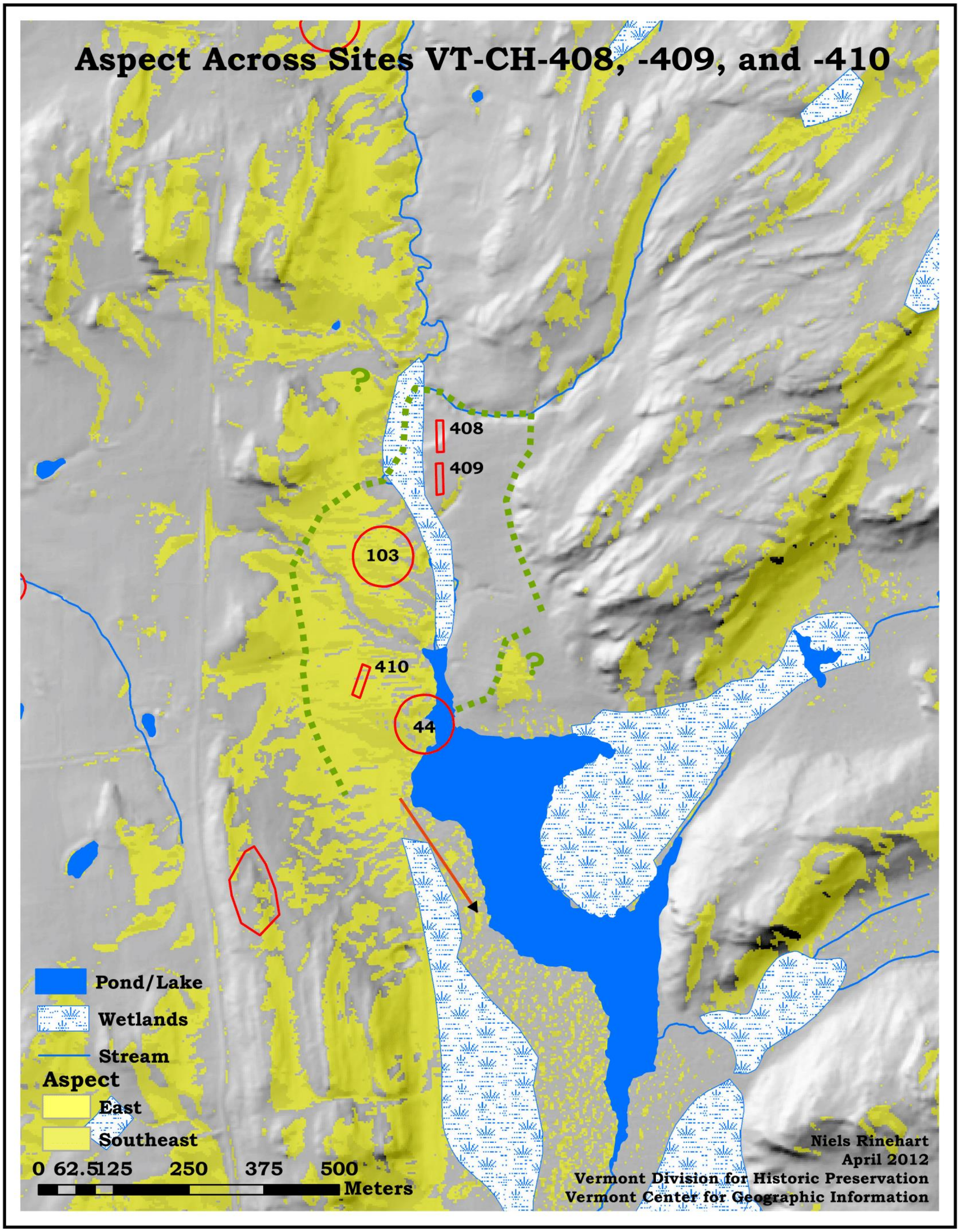

Figure 8. *Aspect across sites VT-CH-408, -409, and –410*

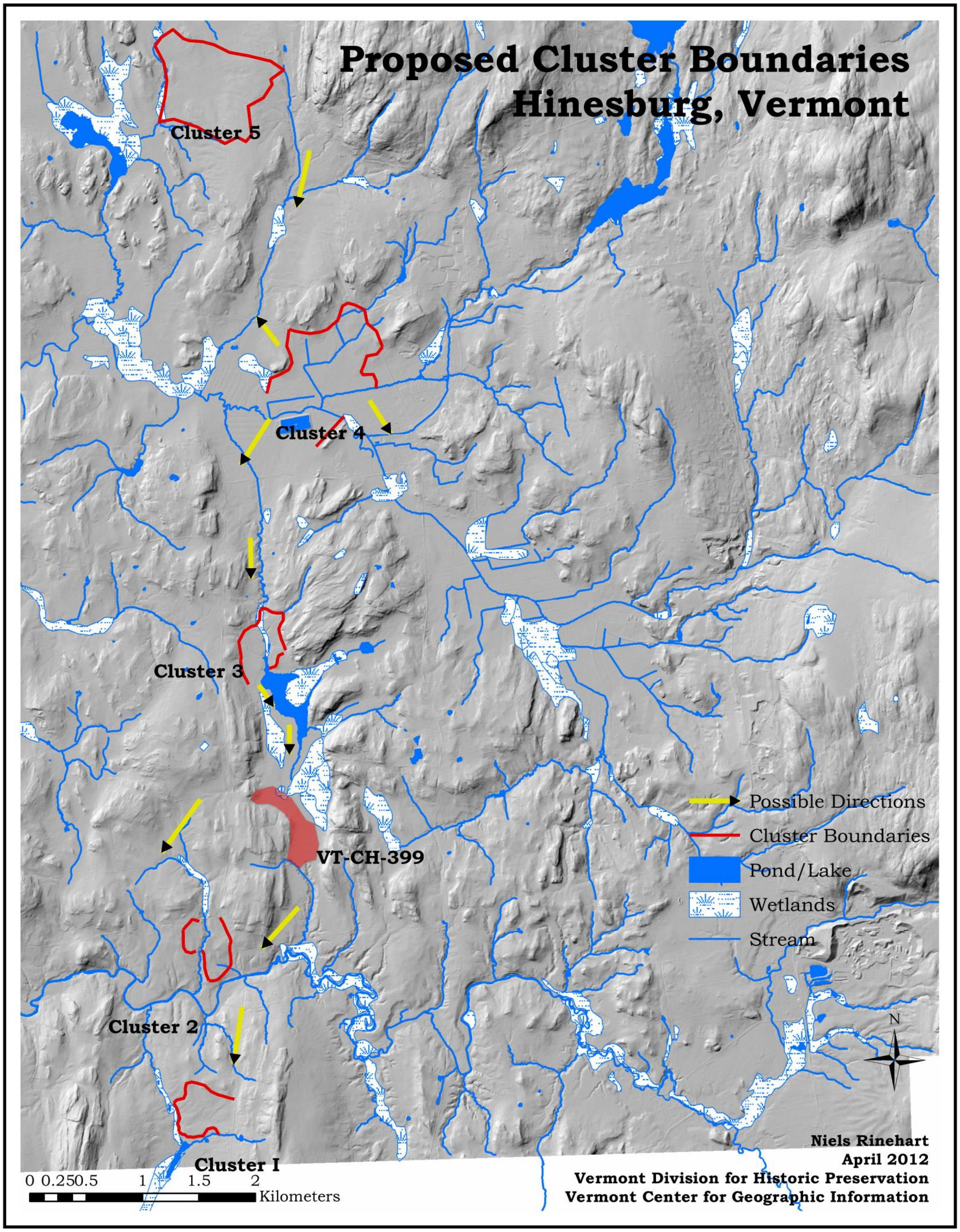

Figure 9. *Proposed cluster boundaries, Hinesburg, Vermont*

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