

THE CONTINUING "STONE MOUND PROBLEM": IDENTIFYING AND INTERPRETING THE AMBIGUOUS ROCK PILES OF THE UPPER OHIO VALLEY

Charity M. Moore and Matthew Victor Weiss¹

Abstract

Rock piles are some of the most ambiguous features encountered in the Upper Ohio Valley, encompassing diverse origins and functions. A single pile can appear to be consistent with multiple interpretations and each interpretation carries implications for how the rock pile is then recorded (or not recorded) and evaluated against the National Register of Historic Places criteria. Building on recent fieldwork at the Bear Knob Rock Piles (46UP342), this article explores historical sources, regional case studies, and archaeological methods that can be used to examine rock features, and calls for the adoption of similar best practices and guidelines at the federal and state levels. Only through a comprehensive, programmatic approach, informed by indigenous knowledge, can archaeologists overcome the ambiguity of rock piles and expand their understanding of the ways people augment and interact with the landscape through the construction of rock features and the material affordances of stone.

Introduction

Cairns, stone mounds, drystone walls, and other rock constructs are some of the most ambiguous archaeological features found in West Virginia, western Pennsylvania, and southeastern Ohio, as well as other regions worldwide. Despite a long tradition of scholarly research, many rock features continue to confound archaeologists due to their ubiquity, diverse origins and functions, and morphological homogeneity. They may include agricultural field clearance cairns and dump walls, burial markers, construction material stockpiles, memorials/cenotaphs, property markers, human or animal effigies (e.g., inuksuk), "garden" art and other recreational constructs (e.g., stone johnnies), fish weirs, clearance piles from road construction or logging, drive lines, trail markers,

slope terracing, retaining walls, hunting blinds, livestock fences (e.g., drystone walls), excarnation or cremation loci, quarrying or mining by-products and stockpiles, celestial alignments and observation seats, push piles, landscape features for vision quests and other ceremonies, structural foundations and piers, etc. Smaller, amorphous rock piles in particular can appear to be consistent with many different interpretations (e.g., prehistoric burial, field clearance, or modern push piles) and each interpretation carries disparate implications for how the pile is then recorded (or not recorded) and evaluated against the National Register of Historic Places (NRHP) criteria (36 CFR 60.4).

Due to the current boom in land development and natural resource extraction in the Upper Ohio River Valley region, rock features are being encountered with increasing frequency in

Charity M. Moore, AllStar Ecology, LLC, 1582 Meadowdale Road, Fairmont, WV, 26554; charity@allstarecology.com
Matthew Victor Weiss, AllStar Ecology, LLC, 1582 Meadowdale Road, Fairmont, WV, 26554; matthew@allstarecology.com

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Figure 1. Left to right, top to bottom: Cairn piled on top of a boulder outcrop in Barbour Co., WV; Single rock pile within a cairn field in Doddridge Co., WV; “Nicked” cairn from a cairn field in Doddridge Co., WV; One of many cairns at 46DO64, a cairn field in Doddridge Co., WV; Rock pile interpreted as a historic-period clearance cairn at 46HS88 in Harrison Co., WV; Portion of a linear pile at 33BL485 interpreted as a historic-period field clearing dump wall in Belmont Co., OH. Photographs courtesy of ASE.

the context of cultural resource management (CRM) and Section 106 review². Conflicting assumptions, varying levels of familiarity, and different methodological approaches among CRM archaeologists, as well as a lack of rock feature-specific guidance at the state or federal level, have so far disallowed research into regional patterns of rock feature construction and often even result in their being excluded from traditional archaeological surveys; however, these sites have the potential to reveal important and exciting insights into the ways prehistoric, historic-period, and even modern people interact with and augment their landscapes.

While conducting Phase I cultural resource surveys for Section 106 review and informal project area walkovers for clients' due diligence over the past three years, we have encountered more than 30 cairn groupings, rock walls, and similar sites in northern West Virginia and southeastern Ohio (Figure 1). These sites typically consist of more than one stacked or amorphous rock pile constructed from local, tabular stones. They are typically located on steep upper hillsides or narrow benches in view of the ridge-line, sometimes overlooking a stream head, and lack any surface artifacts, tool marks, or other obvious clues to their origin. At sites with larger numbers of rock features, they are almost always in very close proximity and are easily visible from one another, as well as often being situated in one or more transects paralleling the topographic contour within a discrete range of elevation. The features are sometimes located near natural rock outcrops or are built on outcropping boulders. Although a few of these sites have prehistoric or historic-period indicators (e.g., road cuts, field edges, nearby Native American sites), most were wholly ambiguous. If these sites are prehistoric, it is likely that the apparent rarity of well-stacked piles, in comparison to other areas like New York (e.g., Cassedy and Bergevin 2015; Windsor 2000) and New England (e.g. J. Gage and M. Gage 2015a; Ives 2015), is at least partially due to the steep terrain and prevalence of clearcutting in the Upper Ohio Valley region. Due to the limitations of our

scope of work and absence of Section 106 review for most of these sites, they could not be investigated beyond a Phase IA-equivalent level of effort and their current conditions are unknown, although a few exceptions are discussed below.

In response to our own difficulty evaluating these resources, we have tried to develop an approach that recognizes the morphological, functional, temporal, and cultural diversity of rock features while still allowing an expedient evaluation within the confines of Section 106. Although this research is, and will always be, ongoing, we have compiled some recommended best practices, archaeological case studies, historic-period and indigenous accounts, archaeological tools and techniques, and interpretative resources to assist CRM archaeologists, researchers, and government agencies in developing a comprehensive, programmatic approach to the identification, recordation, and interpretation of rock features. We have intentionally avoided defining or classifying rock feature types, as this would have been a sizeable, and contentious, undertaking. An earlier version of this article was presented at the Society for Historical Archaeology's 49th Annual Conference on Historical and Underwater Archaeology (Moore and Weiss 2016).

Past Excavations and the "Stone Mound Problem"

Rock features, as we will collectively refer to them to avoid semantic debate, have always been a hot topic in American archaeology; however, they have also often been treated as a "non-standard" site type, particularly in recent years. Nineteenth and earlier twentieth century archaeologists in the Upper Ohio Valley region conducted many investigations of Native American stone and earthen mounds (e.g., Drago 1955; 1956; Fowke 1900; 1902; Inghram, Olafson, and McMichael 1961; Kellar 1961; McMichael 1968; McWhorter 1915; Mills 1914; Moorehead 1897; Squier and Davis 1848; Sutton 1958). The stone features that they excavated ranged

from monumental stone walls and mounds to the clusters of small piles that we have also been encountering, which are described as "not more than a wagon-load of stones" (Fowke 1900:193) or "rude heaps of stone, occasionally displaying some degree of regularity" (Squier and Davis 1848:184).

In 1960, James Kellar, a prominent Indiana archaeologist and stone mound specialist, published a synthesis of this prior research, listing at least 53 stone mound and cairn sites in Ohio, 10 in West Virginia, and 20 in Pennsylvania (1960:478-481). In an insightful and still relevant chapter titled "The Stone Mound Problem," he discusses the often poor excavation techniques and reporting, the various attempts to categorize and date rock features, and the widely differing interpretations of their meanings, most of which he describes as being based in "folklore, and gross analogy" (Kellar 1960:401-412). In retrospect, this era of prolific excavation of rock feature sites and Native American ethnography, as ill-informed as much of it may have been, did provide proof that rock features, including small, amorphous, and attritional piles, were being constructed by Native Americans throughout the eastern United States in both the pre- and proto-historic periods (see Kellar 1960:402-403, 449, 460).

Although none of the State Historic Preservation Offices (SHPO) in the Upper Ohio Valley region record rock features as a separate site type, our literature review and personal communication with many leading archaeologists clearly demonstrates the prevalence of rock features throughout this area of study. The Ohio SHPO (OHPO) does track prehistoric stone mounds and has recorded up to 113 such features, several of which are actually stone circles, cairn fields, or other rock features. Brent Eberhard, an archaeologist at the OHPO, has also separated out cairns during his tenure and is aware of at least nine such sites that have recently been recorded (personal communication 2015) (Table 1). He has also recently added a "Rock Cairn/Features" category to OHPO's list of survey report types, which are designed to make CRM literature

more accessible to researchers.

In 2011, a West Virginia SHPO (WVSHPO) archaeologist wrote that their records include approximately 115 rock feature sites (Scarr 2011), some of which are relatively high-profile and controversial; however, no comprehensive studies of these sites have been undertaken. These well-known West Virginia rock feature landscapes include the Mount Carbon Stone Walls (46FA1; see M. Gage and J. Gage 2009a; Inghram, Olafson, and McMichael 1961; Jeffers 2010), those in the North Bend (see Boulware et al. 2013) and Stonewall Resort (see The Associated Press 2011; M. Gage and J. Gage 2009b; Tri-State Company, Inc. 2013; Weller 2012) state parks, and the Bens Run Earthworks (46TY2) (Spencer 2010; see also WVDCH 2015).

No information was available regarding the number of rock feature sites in Pennsylvania, as they are varyingly recorded as burial mounds, earthworks, and "other," or as components of larger sites. However, landscapes with cairns and rock walls are known throughout western Pennsylvania (Kellar 1960:479-480; Mark McConaughy, personal communication 2015; PHMC 2015).

Most other SHPOs across the country also reported dealing with rock features on a relatively regular basis (Table 2), and a small number of archaeologists are actively researching the topic through the compilation of data on known rock features and new excavations (e.g., Holstein 2010; Holstein, Hill, and Little 2004; Loubser and Hudson 2005; Loubser and Frink 2010; Murphy 2004, 2010; Rennie and Lahren 2004). Despite this, our understanding of rock features as a whole has not significantly progressed beyond Kellar's 1960 publication.

The Present State of Rock Feature Research

In the course of researching rock features, we came across many experienced archaeologists who had regularly encountered rock piles and walls, or were at least aware of their existence, but who had not previously thought to re-

Table 1. Personal communication references.

Name	Affiliation	Role
Anderson, Dean	Michigan SHPO	State Archaeologist
Barber, Michael	Virginia SHPO	State Archaeologist
Biella, Jan	New Mexico SHPO	Deputy SHPO/State Archaeologist
Black, Rachel	Georgia SHPO	Deputy State Archaeologist
Boisvert, Richard	New Hampshire SHPO	State Archaeologist
Brooks, Bob	Oklahoma Archeological Survey	Assistant Professor/State Archaeologist (Retired)
Deel, Judith	Missouri SHPO	Compliance Coordinator
Denton, Mark	Texas SHPO	Archaeology Program Coordinator
Deter-Wolf, Aaron	Tennessee Division of Archaeology	Prehistoric Archaeologist
Eberhard, Brent	Ohio SHPO	Archaeology Survey and Data Manager
Gage, James	Independent	Researcher/Historian
Gage, Mary	Independent	Researcher/Historian
Hoard, Robert	Kansas SHPO	State Archaeologist
Ives, Timothy	Rhode Island SHPO	Principal Archaeologist
Johnson, Amy	Indiana SHPO	State Archaeologist
Labadia, Catherine	Connecticut SHPO	Staff Archaeologist
Lamarre-DeMott, Lora	West Virginia SHPO	Senior Archaeologist
Laracuate, Nicolas	Kentucky SHPO	Archaeology Review Coordinator
Marcopul, Katherine	New Jersey SHPO	Supervising Historic Preservation Specialist
Martin, Alexandra	Ceremonial Landscapes Research	Co-Owner/Co-Founder
Martin, Bill	Texas SHPO	Archaeologist
Maslowski, Bob	Marshall University/USACE	Adjunct Professor/Archaeologist (Retired)
McConaughy, Mark	Pennsylvania SHPO	Regional Archaeologist
McGimsey, Charles	Louisiana SHPO	State Archaeologist
Medin, Anmarie	California SHPO	Archaeology Review Unit Supervisor
Merritt, Christopher	Utah SHPO	Deputy SHPO
Molina, Yolanda	Independent	Landowner
Nelson, Trisha	Nebraska SHPO	Archaeology Collections Curator
Picha, Paul	North Dakota SHPO	Chief Archaeologist
Pouley, John	Oregon SHPO	Assistant State Archaeologist
Robinson, Jess	Vermont SHPO	State Archaeologist
Rubingh, Amy	South Dakota SHPO	Review and Compliance Archaeologist
Rush, Laurie	Fort Drum	Cultural Resources Manager/Army Archaeologist
Scoggin, Robert	Arkansas SHPO	Senior Archaeologist/ Review Coordinator
Sipes, Eric	Alabama SHPO	Senior Archaeologist
Tobias, Mark	Colorado SHPO	Section 106 Compliance Manager
Vanderhoek, Richard	Alaska SHPO	State Archaeologist
Weston, Timothy	Kansas SHPO	Archaeologist
Wilmoth, Stan	Montana SHPO	Deputy SHPO/State Archaeologist
Wise, Roger	West Virginia DOH	Supervisor for Archaeology (Retired)
Wollwage, Lance	Washington SHPO	Assistant State Archaeologist

Table 2. State Historic Preservation Office Inquiry Results*

Opinions on Rock Features		Relative Frequency of Rock Feature Review	
Often Significant (<i>Have Guidance</i>)	3	Regular	30
Often Significant (<i>No Guidance</i>)	7	Rare	2
Varies	19	Never	2
Rarely Significant**	5	No Response	16
Not Applicable	1		
No Response	15		

*Based on author's interpretation of SHPO responses

**MA SHPO's opinion was determined from their website

search or record them as cultural resources. In many cases, these "non-standard" features are overlooked in favor of traditional archaeological resources (see Ballard and Mavor 2006:37-38; Ives 2013; Muller 2009). In the CRM industry, tight budgets and schedules make it especially tempting to ignore ambiguous features, as no developer wants to be told that they should avoid a pile of rocks based on an unproven possibility that it may be significant². The uncertainty surrounding rock feature interpretation then perpetuates the lack of research.

State Historic Preservation Office Opinions and Guidance

We contacted the officer and/or head archaeologist at all fifty state SHPOs, or in a few cases a state archaeologist, in order to gauge their awareness of and opinions on the rock feature problem, as well as to gather approaches to their recordation and interpretation. The results were widely varied, with no clear patterns in regard to region of the U.S., the characteristics of known rock features, or the presence or absence of recognized Native American tribes (Table 2). Only a few states, such as Montana, North Dakota, and Oregon, have formal guidance in place, some of which is discussed below. Connecticut is currently in the process of developing a Landscape Inventory Form, which will include ceremonial stone landscapes (CSL), (James

Gage, personal communication 2015; Catherine Labadia, personal communication 2016), and other SHPOs also expressed the need for improvement in the way they handle rock features. A few other states (e.g., New Mexico and Nebraska) at least have site categories that account for the full range of prehistoric, historic, and ambiguous features. The majority of SHPOs, including those in our study area, consider rock features on a case-by-case basis, with some emphasizing the importance of broad contextual research (e.g., Alabama, Alaska, Montana, Oregon), some emphasizing the need for tribal consultation (e.g., California, New York, Oregon, South Dakota), and others requiring that each feature's significance be individually demonstrated against the NRHP criteria (e.g., Arkansas, California, Kansas, Missouri, Texas) (Cassedy and Bergevin 2015; OPRDOH 2015).

In many cases, our communication revealed an explicit or implicit assumption that rock features are rarely NRHP-eligible unless they are associated with prehistoric burials or are part of larger historic-period sites, such as farmsteads. Conversely, a few federal and state agencies did seem to assume that rock features are prehistoric and/or potentially NRHP-eligible, unless there is good evidence to the contrary, and prefer to avoid them (Table 1). While some states noted the potential NRHP-eligibility of a variety of both prehistoric and historic-period rock features (e.g., Montana, North Dakota, Oregon, Rhode

Island, Utah, Vermont) (Table 1) (OPRDOH 2015; SHSND 2015), other states expressed an opinion that most rock features, particularly rock walls, are non-native in origin or that historic-period rock features are unlikely to be eligible. A few SHPOs (e.g., Louisiana, New Hampshire) stated that they rarely, if ever, deal with rock features during Section 106 reviews, even though in at least one case rock features are known to be present throughout their state. One SHPO archaeologist indicated that there are many rock features in their state but there has been no particular effort by professional archaeologists to record them.

The most extreme SHPO opinion we encountered came from the Massachusetts SHPO's website, which claims that "research into such stone piles [has] invariably shown that these features are not associated with the Native American settlement of Massachusetts" (MHC 2015). The website then goes on to assign all rock piles and walls to agricultural activities and property boundaries (MHC 2015), with the implication that historic-period rock features are not culturally significant. The Massachusetts SHPO did not respond to our request for comments, but their opinion has often been rebutted (e.g., J. Gage and M. Gage 2015a; Muller 2009; NEARA 2015; Rush 2015), or even overturned by other federal agencies as in the high profile Turners Falls case (Albertini 2009; NPS 2008; Timreck 2011). The Turners Falls Sacred Ceremonial Hill Site was initially interpreted by the Massachusetts SHPO as the remains of historic-period walls, despite information from several Native American tribes that it was a sacred ceremonial area (NPS 2008:1). The Keeper of the NRHP found that the area was NRHP-eligible as a Traditional Cultural Property (TCP); however, the Massachusetts SHPO continues to deny this and, to the best of our knowledge, has not even assigned the area a state trinomial site number.

Ceremonial Stone Landscape Conference

In October 2015, we attended a conference sponsored by the Penn Cultural Heritage Center

in Philadelphia, entitled "Interpreting the Past: Ceremonial Stone Landscapes of the Northeast." During this conference, academic and CRM archaeologists, Native Americans, and SHPO and Tribal Historic Preservation Office (THPO) representatives self-critically discussed the poor state of research and protection for sacred indigenous landscapes, which are often underrepresented in the archaeological record. Common themes included the acknowledgement that rock feature research requires an embedded understanding of indigenous landscapes, cosmologies, and experience, as well as reminders about the need to respect native beliefs about the appropriate treatment of rock features. Rather than place the blame for the current situation solely on outsiders, several individuals noted that archaeologists, SHPOs, the ACHP, and tribal groups have become apathetic and should instead be taking on the responsibility of educating themselves, their counterparts, government agencies, and developers.

Another general consensus among speakers and attendees seemed to be that archaeologists must stop imposing their own academic, racial, or ideological biases and must recognize that prehistoric, post-contact Native American, and historic European American rock features are all worthy of study and preservation. Panel discussants noted that archaeologists who are faced with their inability to interpret a rock feature often mistake their ignorance for some kind of epistemological impasse inherent to these features. Because the growing body of literature refutes such an impasse, archaeologists must consider that their inability to interpret rock features may actually be the result of insufficient effort on their part and biases about what types of cultural resources are important or interesting. Panelists concluded that, through deep collaboration with native groups, archaeologists *can* learn to read the landscape and take on the responsibility of speaking on behalf of disenfranchised native peoples, especially when the absence of federally-recognized tribes or loss of oral traditions about rock features is the direct result of their displacement and cultural suppres-

sion.

The rock feature sites that were presented at the conference, such as the celestial alignments at Fort Drum, New York (FDP 1151 and 1207; Rush 2015), the "memory piles" along the Constitution Pipeline in Pennsylvania and New York (Cassedy and Bergevin 2015), and the CSLs at Lawton Foster Road, Hopkinton, Rhode Island (RI 2792) and Turners Falls, Massachusetts could not have been fully recognized or interpreted by archaeologists alone, but they can now be used as case studies to interpret other stone landscapes. Lawton Foster Road is a particularly striking example of this, as the varying opinions are well documented in local media and in rock feature blogs (e.g., Drummond 2014; Waksman 2015).

Implications for Public Archaeology and Collaboration

The issues described above have had another unfortunate side effect. In our experience, members of the public who are confronted with the apparent antiquity and visually impressive nature of rock features often become frustrated with their dismissal by professional archaeologists, or by archaeology's failure to explain their origins. As a result they often turn to pseudo-archaeological or mystical explanations. These features' ambiguity creates an ideal situation for theories about extraterrestrials, lost civilizations, and supernatural entities to flourish, as people try to make sense of these landscapes. However, this ambiguity has not stopped many avocational and amateur archaeologists, historians, and other researchers from conducting insightful and thorough research on cairnfields, rock effigy sites, and other stone landscapes. Although some interpretations may not be based on conventional science, history, or archaeology, the many websites, blogs, and articles resulting from this public interest contain a wealth of primary data that are invaluable to the archaeological researcher (e.g., NativeStones.com 2006; Waksman 2005, 2015; and see Muller 2009:17). Rather than belittling or alienating non-archaeologists, we

should encourage public interest in archaeology and coordinate our efforts to understand the past.

In fact, our literature review demonstrates that the most comprehensive, ongoing rock feature research in the northeastern United States is *not* being conducted by professional archaeologists. The websites and publications of the New England Antiquities Research Association (NEARA 2015; see Ballard and Mavor 2006; Holstein 2012; Muller 2009), a group of primarily "amateur" rock feature researchers, and of historian mother-and-son team Mary and James Gage (J. Gage 2014; M. Gage 2015; M. Gage and J. Gage 2009a, 2009b, 2015; J. Gage and M. Gage 2015b) are far more comprehensive than the vast majority of modern archaeological publications. The Gages alone have filed more than 50 rock feature site forms in Rhode Island and Connecticut. The results of such long-term research should not be discounted simply because individuals do not hold academic degrees in archaeology or work in CRM, particularly when these individuals are the ones who try to reach out to professional archaeologists (see Muller 2009). As Mary Gage (personal communication 2016) pointed out, historians are often better qualified to conduct certain aspects of rock pile research, such as analyzing primary documents.

The Continuing Stone Mound Problem

Ongoing confusion and archaeological attitudes toward rock features have contributed to a great loss of information, which makes current attempts to understand them even more difficult. As early as 1897, prolific Ohio Valley excavator Warren Moorehead (1897:214 cited in Kellar 1960:401) stated that the paucity of artifacts associated with small rock piles meant "It is certain that scientists can learn nothing more from them and further excavation [is] unnecessary." As James Kellar (1960:401-402) argues in "The Stone Mound Problem," this observation seems to have led to their neglect in later archaeological research, when ...the fact that less data may be present than desired emphasizes the importance of what is available." This statement

could apply to historic rock features as well, which are often undervalued due to their lack of a subsurface component.

This unfortunate trend of overlooking and undervaluing such rock features has been so prevalent in current archaeology that, in 2007, the United South and Eastern Tribes, Inc. (USET 2007), a federation of 24 federally-recognized tribes, formally condemned the actions of "archaeologists and SHPOs [who] categorically...dismiss these structures as non-Indian and insignificant, permitting them to be the subjects of sacrilege of archaeological dissection and later destruction during development projects." An increasing number of archaeologists now incorporate this resolution into their NRHP evaluations (e.g., Boulware et al. 2013; Deter-Wolf and Hockersmith 2007; Moore, Weiss, and Collins 2015; Rush 2015) by placing the burden of proof more heavily on historic-period and modern interpretations. For example, Deter-Wolf and Hockersmith (2007) discuss a case in which three groups of morphologically similar, stacked and amorphous rock features in Tennessee, all of which lacked subsurface artifacts in the surrounding area, were evaluated for their eligibility for inclusion on the NRHP. The first site (40RD222) was evaluated prior to the USET resolution and was presumed to represent a "historic stoneworks" site. It was found to be ineligible and was subsequently destroyed by highway construction. The later sites (40RD278 and 40RD281) were evaluated after the USET resolution and were recommended potentially NRHP-eligible as Traditional Cultural Properties and were avoided by developers. The investigators took this one step further by also arguing that intact rock features are NRHP-eligible under Criterion D (36 CFR 60.4) even without associated archaeological deposits because the rock features themselves can contribute to archaeologists' understanding of them (Deter-Wolf and Hockersmith 2007:6-7), an argument that could also easily be applied to the many historic-period features that go unrecorded and are presumed ineligible.

Historic-Period Research Potential

An anti-historic bias among CRM archaeologists, which was noted in the responses of some SHPOs, has also resulted in assumptions that rock piles are not important and in archaeologists not recording these features with the same level of effort that they would record known prehistoric features or "standard" historic archaeological features such as a stone foundation wall. As one SHPO responded, "...rock piles...have potential to be important cultural resources... [; however,] historic period constructs...generally are not NRHP eligible by themselves...." Possibly the result of most CRM archaeologists having predominately been trained in prehistory, this bias is then reflected in SHPO documentation guidelines (Christopher Merritt, personal communication 2015). In contrast, Rhode Island state archaeologist Timothy Ives (2013; 2015) and former West Virginia state archaeologist Robert Maslowski (Maslowski and Miller 2015), following Ives, who believe that a large portion of rock piles and walls are the product of early historic-period field and pasture clearance³, argue that these features are still archaeologically significant. Ives (2015:119-120, 128) theorizes that agricultural features can reveal new information about agrarian-pastoral ideals, changing farming practices, and the ways in which farmers dealt with issues of sustainability. Ives (2015:125) continues that "The cairn fields we encounter in the woods today are not static monuments to the past, but ever-changing mediums in ever-changing landscapes expressing the relationship between people and their environment."

Building on this, we argue that historic-period rock feature sites have the potential to yield information that is just as valuable to our understanding of the past as conventional archaeological sites, and can therefore be NRHP-eligible under Criterion D, or possibly even Criteria A and C (36 CFR 60.4) as representations of patterns of historic-period activity and construction. In our opinion, activities associated with the construction of non-Native American



Figure 2. This cairn from Ohiopyle State Park, PA has been varyingly interpreted as part of a prehistoric cemetery and as the product of historic-period field clearance. The central depression may be evidence of looting. Photograph courtesy of Mark McConaughy.

rock features (e.g., initial clearing of fields, gathering stone for construction, building the first roads to access timber) are more likely to be associated with the initial European American settlement of an area, rather than representing activities associated with ongoing occupation of an area throughout the historic-period. If these features were being constructed throughout the later historic or modern periods, we would expect more local informants who are familiar with their origins, or who even remember them being constructed (but see Maslowski and Miller 2015).

Potential research topics in the historic-era construction and use of rock piles include agricultural practices and economic development (see Ives 2015; e.g., selling building material), property boundaries and subdivision, land use and demarcation (e.g., livestock rotation; arable

land vs. pasture), presence of historic-period activities (e.g., farming; mining; logging; road construction), social and economic status (e.g., plowing rocky, upland landforms; maximizing pasture), continuity in indigenous beliefs or subsistence practices (e.g., Alaskan inuksuk; fish weirs), labor/draft animal availability, agrarian aesthetics, linking stone structures to raw material sources, and stone dressing and construction techniques.

Maslowski and former West Virginia Division of Highways (DOH) archaeologist Roger Wise (personal communications 2015; Maslowski and Miller 2015; Steelhammer 2015) have applied historic-period agricultural interpretations to many newly documented or well-known West Virginia sites, including the Burton/Molina Farm in Lincoln County⁴, Velma and Brynwood Drives near Charleston, and the

North Bend and Stonewall Resort state parks although the potential significance of historic-period features has not necessarily been noted in all cases and other researchers believe some of these sites are prehistoric. Incidentally, none of these sites appear to have been recorded for the West Virginia SHPO or to have been assigned state site numbers, making comparative research more difficult. A European-American field boundary and clearance interpretation has also been applied to the Ohiopyle State Park cairns (36FA338) in Fayette County, Pennsylvania (Mark McConaughy, personal communication 2015), although they also were originally recorded as a prehistoric site (Figure 2).

Rock Feature Reuse and Continuity

When making determinations about a rock feature's age, it is important to note that they may also be reused in later time periods and that prehistoric-through-modern indigenous forms may be identical, therefore providing an opportunity to study evolving attitudes toward landscape and patterns of activity. Even the eventual fates of these features (e.g., reuse by landowners, destruction by developers, excavation by archaeologists, preservation by Native Americans) can illuminate contemporary attitudes and social issues. For example, prehistoric cairns may be added to during historic-period field clearance, as Kellar (1960:371) discovered at the C. L. Lewis Stone Mound (12SH02) in Shelby County, Indiana. Even prehistorically, burial features were added to or even emptied and reused, as Fowke (1900) noted in his Brown County, Ohio excavations. Ives' (2015:119-121) model even specifically includes reuse of clearance cairn material. As Kellar (1960:401) and Brent Eberhard (personal communication 2015) both point out, many prehistoric rock features would also have been cannibalized for European American chimneys, walls, and other structures. In other cases, however, tribal accounts and local anecdotes indicate that European farmers respected native rock features, which, as Waksman (2005) notes, might be expected of immi-

grants coming from countries that also have rich rock piling traditions.

In states like Alaska and North Dakota, which still have active indigenous populations, the SHPOs have respectively reported modern subsistence-oriented features like inuksuk (human stand-in) and marker features like "stone johnnies," which are virtually indistinguishable from their prehistoric counterparts (Hansen 2008; Richard Vanderhoek, personal communication 2015). It is interesting to consider how such features may have been interpreted by archaeologists if firsthand, indigenous explanations were not available. According to many firsthand accounts cited in Kellar (1960:402-403; 448-449), post-contact Native Americans regularly constructed small rock piles for temporary burials far from their settlements or to commemorate the place of a warrior's death, with additional stones being "haphazardly" added by passersby (see Rennie and Lahren 2004:41, 51-53), a pattern which would be consistent with many of the CSLs under discussion today. In a few documented cases, modern native (or possibly neopagan) activity resulted in the introduction of historic-period or modern items into prehistoric CSLs (James Gage, personal communication 2016; Waksman 2015). Even agricultural clearance cairns may have been built by pre- or post-contact Native American farmers, who may have incorporated traditional elements and practices (see Ives 2013:42; Rennie and Lahren 2004:63-64; Waksman 2005).

Archaeological Approaches, Indicators, and Techniques

We have argued that rock features are under-researched because many archaeologists (1) are unfamiliar with how to identify, record, and interpret them, (2) erroneously assume they are historic if prehistoric burials or artifacts are absent, and (3) believe that historic rock features lack cultural significance and research potential. So, given the culturally and temporally ubiquitous nature of these features, as well as their ap-

parent morphological homogeneity, how should cairns, stone mounds, drystone walls, and other rock constructs be dealt with when encountered, particularly in everyday CRM archaeology?

Cultural context is often the key to "translating" the symbolic and structural meanings of rock features. However, indigenous expertise and oral history is not always available to the archaeologist, whether as a result of funding restrictions, the conditions under which a particular CRM contract was undertaken, or, as in much of the Upper Ohio Valley region, the absence of federally-recognized tribes and THPOs (cf. Ballard and Mavor 2006:42). The lack of THPOs or tribes should not be used as an excuse to avoid Native American involvement in Section 106 review, as any such absence can generally be attributed to the actions and attitudes of those federal and state governments. The same argument can be made for cases where indigenous groups are present, but are unable to assist with rock feature interpretations due to a loss of traditional knowledge.

Under such circumstances, the responsibility lies with the archaeologist to educate themselves to be able to understand and speak on behalf of the stone features' builders, particularly because the strengths of archaeology, such as scientific recordation, critical thinking, and ethnology, make archaeologists uniquely qualified. Just as archaeologists are taught to thoroughly record the primary data on which to base their interpretations in order to allow for future re-evaluations, they must record rock features in a way that acknowledges their current biases and limitations and affords peer reviewers and future researchers the opportunity to reassess their findings, particularly when a site is under threat of development. Although the nature of these features will always disallow quick and definitive interpretations, new approaches may move us toward a better understanding.

Through an ongoing literature review, we have attempted to identify useful indicators and recordation techniques that can be applied to newly encountered features. In conjunction with ASE, we are currently experimenting with some

CRM-appropriate recordation techniques (i.e., they are inexpensive, expedient, and focused on non-invasive data recovery) that we hope to make available in the future⁵. Although the large volume of available information prevents a comprehensive review within a single publication, the paragraphs below include the results of some of this research⁶.

A number of non-invasive techniques can be applied in the field to obtain useful, comparative data on rock features for establishing regional patterns and other future research, particularly when conventional archaeological techniques are inappropriate. The following is one example of the minimum level of effort needed to collect these data. To obtain a representation of a rock feature's size and shape, as well as the individual rocks that compose it, a standard plan map and profile maps along two perpendicular axes should be drawn. Photographs should be taken from each side of a rock feature, as well as in plan view and of any significant characteristics. A thorough effort should be made to record the topographical setting and surrounding land uses. This includes taking photographs of, azimuths toward, and detailed field notes on the landform, slope, and vegetation, as well as noting the presence of outcrops and any nearby anthropogenic features, disturbances, etc. These may offer clues to the researcher as to the function and relative age of a rock feature. Recording short videos may prove helpful in capturing particular traits of a rock feature or its setting that are not readily visible in a photograph, and videos allow others to "experience" the location for themselves. Particular traits of rock features should also be recorded, such as stone type selection and size, the presence of niches and what direction they face, if individual rocks could be lifted by one or two individuals, and construction and stacking techniques. To record the soil on which a rock feature sits, a square STP or test unit could be excavated directly adjacent to the feature, if appropriate. This could allow the identification of a plow zone, which may then indicate whether or not a feature was built as an agricultural clearance cairn.



Figure 3. This "crib"-shaped cairn from Rhode Island is interpreted by Ives (2015:125) as evidence of agricultural field clearing. The cairn is constructed of a ring of inward sloping, stacked stones built upon an immovable bedrock outcrop to capitalize on wasted space. As demonstrated by other similar features, the rings of this cairn type are filled with smaller stones allowing for a large quantity of stones to be stored within a small footprint. Photograph courtesy of Timothy Ives.

Many more in-depth recordation or analysis techniques have also been used or proposed for recording rock features, some of which should only be conducted if the features are to be destroyed by future development and/or after consultation with native groups. These techniques, some of which were used in the case studies below, include conventional archaeological excavation, remote sensing and geophysical survey, three-dimensional (3D) scanning, time-lapse photography as rock features are disassembled, planetarium reconstructions, pathway analyses, calcium and phosphorous soil tests for the identification of burials, and measuring lichen

growth.

Careful observations of specific characteristics can inform the researcher of a rock feature's potential origin(s) and function(s). Numerous indicators of prehistoric/native rock features have been noted in the existing literature. These include: placement of rock features near distinctive natural features (e.g., outcrops, hydrologic features, impressive viewsheds); the use of stones with ground "nutting" holes or petroglyphs; the presence of lichen growing within the interior or over large portions of a feature; the incorporation of fossils, quartz, or orange stones into prominent places within a feature,

such as niches and "stone caves;" and the presence of thermally-altered rocks from cremation or feasting (e.g., Kellar 1960:377; Bob Brooks, personal communication 2015). Additional indicators specific to CSL's include: alignments of stones to celestial objects or events (e.g., solstices, seasonal indicators, culturally-significant events) on natural or artificially-created horizons, standing stones, effigies (e.g., turtles, bears, and snakes), paired stones and split boulders (which may be natural or anthropogenic), observation seats, associated distinctive or culturally-significant flora (e.g., Rush 2015), the use of non-local stone transported from a distance away, post-molds along alignments (which could be used as temporary construction markers; Rush 2015), and evidence of modifications to or moving of stones (e.g., flaking, soil deformation). Indicators that may be noted during an archaeological excavation include the presence of artifacts, bones, charcoal, ochre, dark soil stains, and cists underneath rock features.

Many indicators also exist for assisting in the identification of historic-period rock features. Rock features with stones or construction techniques similar to those used in the construction of nearby historic-period structures may indicate contemporary activities, or even possible stockpiles of future building materials. A survey of old buildings in the surrounding area can shed light on the type of stone sought by these structures' builders (e.g., M. Gage 2015). Rock features whose positioning on the landscape maximizes arable land while minimizing labor may represent agricultural field clearing. Such features may have crib-like shapes that can contain small, unstacked stones (Figure 3; Ives 2015:125). Plow marks or scratches from machinery on piled stones may also indicate a clearance cairn. Drystone walls built with European techniques (e.g., double walls with a rubble fill) would also indicate historic-period constructions (Maslowski and Miller 2015; Strezewski 2004:29-30). Placement of rock features along field edges, fences, and roads may indicate association with historic-period agricultural and road building activities. Limited or absent lichen and

moss growth are possible indicators of a relatively recent origin. Rock features found at parcel corners and intersections were likely constructed for demarcating property lines.

These methods and indicators can be supplemented and supported by background research. A review of work by current and past amateur researchers, avocational archaeologists, or professionals will likely reveal useful information on the appearance and characteristics of local rock features of known Native American origin, particularly in regard to descriptions of old excavations. A review of SHPO records may also reveal local or regional patterns of rock features. Many websites provide a plethora of photographs and data documenting both historic-period, known prehistoric, and presumed prehistoric rock features. These websites can reveal regional trends of rock feature morphology and construction, provide data free of charge, and are easily accessible. Invaluable information may be obtained from Native American groups, local residents, and firsthand historical accounts of rock features constructed by proto-historic Native Americans. It is important to study the land-use history of a given research area at both a large and narrow scale. County history books, county soil surveys, historical aerial imagery, tax maps, and other historical records can inform the researcher on how the landscape changed over time, indicating what rock feature types may be encountered.

With these approaches in mind, the following case studies demonstrate several constructive approaches to documenting rock feature sites.

Case Study: Bear Knob Rock Piles (46UP342), WV ("Process of Elimination" Approach)

In April 2015, ASE's cultural resources personnel, including the authors, identified 23 rock piles during a pedestrian survey of a proposed bat conservation bank in Upshur County, West Virginia (Figure 4; Moore, Weiss, and Collins 2015). These rock piles are situated on the very steep wooded slopes of Bear Knob, the tallest hill in the Hackers Creek drainage (McWhorter

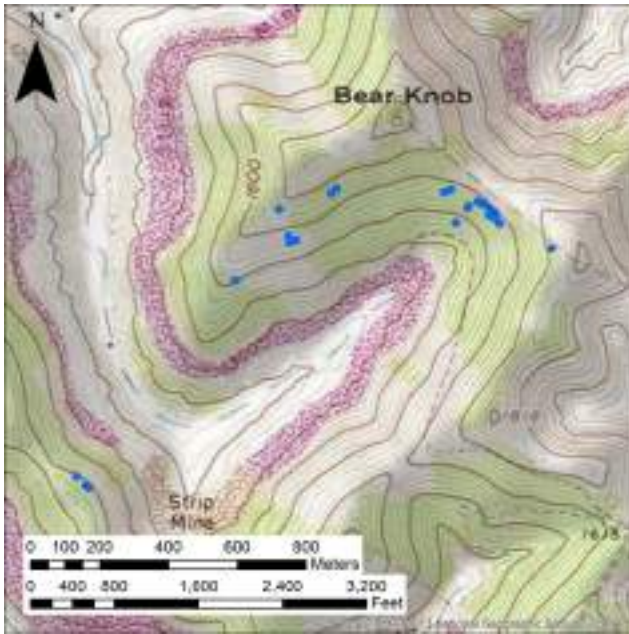


Figure 4. Distribution of features at the Bear Knob Rock Piles (46UP342) site, 1976 USGS topo map. Those on the western side of the valley are not included within the site boundary. Map courtesy of ASE.

1915:307). In the course of preparing the Phase I survey report, background research revealed that the Hackers Creek valley was settled by European Americans in the 1770s and shortly became the most attacked settlement in all of northwestern Virginia, with one or more Native American attacks every year from 1778 until the Treaty of Greenville in 1795 (Smith 1920:35, 54-55). Many Native American archaeological sites have been identified within and near the Hackers Creek drainage, spanning the entire chronology of prehistoric periods up through European contact.

Most archaeological research and excavation within the valley is credited to Lucullus Virgil McWhorter, a late-nineteenth century avocational archaeologist and Native American rights activist who writes about his investigations at a number of Native American sites including villages, mounds, burials, and cairns (McWhorter 1915:21, 69-74). In *The Border Settlers of Northwestern Virginia*, McWhorter mentions several "stone filled graves" located on hillsides and ridges throughout the area, as well as

"stone-heaps" that he has excavated (McWhorter 1915:72, 74, 77). Underneath one "stone-heap," located on a ridge near the rock piles identified on Bear Knob, measuring 3-by-8 feet in size and 18 inches in height, McWhorter found a thermally-altered spear point amongst a layer of ashes that were capped by a fire-cracked sandstone slab (McWhorter 1915:72). Another similarly-sized ridgetop "stone-heap" in the Hackers Creek drainage possessed no artifacts, while yet another "stone-heap" of similar size located on an upland "flat" revealed lithic debitage and charcoal underneath (McWhorter 1915:72). Adjacent to Bear Knob and far up the hillside, McWhorter excavated an "effigy-like" rock feature consisting of a large central boulder from which extended cross-like arms (McWhorter 1915:72-73). Although excavations revealed no associated artifacts at this rock feature, McWhorter believed it to be of Native American origin (McWhorter 1915:73).

It is unclear as to what McWhorter's term "stone filled graves" signifies, but they were likely surface piles of stone overlying graves since he juxtaposes them against stone cist graves (McWhorter 1915:77), which would have been lined with stone. Therefore, it is possible that "stone filled graves" are simply "stone-heaps" that have graves underneath. In any case, his investigations clearly demonstrate that Native American rock piles are present in the vicinity of Bear Knob. McWhorter also notes that the entirety of Bear Knob had been clear-cut (1915:307), which could bring the survival of any prehistoric rock features into question, or could explain their poor condition.

In an attempt to determine the relative age and function of the rock feature site on Bear Knob, ASE applied a "process of elimination" approach as used by Deter-Wolf and Hockersmith (2007). Because rock features constructed by Native Americans can have a very wide range of forms, having been constructed for commemorative and ceremonial purposes largely unknown to archaeologists, ASE has found it more effective to begin the process by first considering the historic-period activities



Figure 5. Rock Pile 4 on Bear Knob (46UP342). This feature along an abandoned field edge and composed of haphazardly piled, rounded cobbles and boulders was interpreted as a possible historic-period agricultural clearance cairn. Photograph courtesy of ASE.

that can result in the creation of rock features; however, one must keep in mind that long-term anthropogenic activity within an area will result in features of differing ages overlapping in a single landscape. Using this approach, one examines the morphological and contextual characteristics of a rock pile to determine if it would make logical sense for having been used for, or the by-product of, various historic-period activities. The historic-period activities/sources considered for this site included agricultural field clearing, property markers, stockpiles of construction materials, "garden art" (Deter-Wolf and Hockersmith 2007:3), clearing for timber, access road clearing, and slope terracing (Gresham

1990:11). The following derives from ASE's archaeological reports and provides some basic indicators for discerning historic-period rock piles using this approach.

Discarded rocks from historic-period field clearing are expected to be found downslope of arable land (Deter-Wolf and Hockersmith 2007:4). If this was not possible, however, the rocks would likely be built into a single pile or wall to decrease the amount of arable land they covered (Deter-Wolf and Hockersmith 2007:4). Rock piles that exhibit very neat stacking into specific shapes are not likely the result of collecting construction materials to be used at a later time, as dismantling of such a pile would ne-

gate the labor and time investment spent in its construction (Deter-Wolf and Hockersmith 2007:4). Additionally, piles constructed of poor building stone are unlikely to have been built for storage of future construction materials (Deter-Wolf and Hockersmith 2007:4). M. Gage (2015) provides a comprehensive review and guide for distinguishing prehistoric rock piles from those built for field clearance and stockpiling of building material during the historic-period. Historical maps depicting the location of houses and property lines can offer clues as to the potential use of rock piles for "garden art" and demarcating property boundaries (Deter-Wolf and Hockersmith 2007:4). Rock piles created from access road clearing are located adjacent to the road and would expect to be found on the road's downhill side. Field observations have noted that rudimentary roads remain visible long after they are abandoned. Rock piles or walls built for use in slope terracing are built into linear arrangements paralleling the contour of a hill and often built in groups up a hillside. Rock piles built for the purpose of opening up pastureland are found on soils which were initially covered in a thick layer of surface rocks and outcrops and are located within current fields or overgrown areas that were used for grazing in the past (Ives 2015:125-127). These piles are expected to be constructed in a way that maximizes grass growth such as along field edges or within minimal footprints.

If each purpose or activity is found to be implausible for a rock pile's creation, it can be ruled out and, when no plausible historic-period activities remain, the feature is deemed likely prehistoric. As Deter-Wolf and Hockersmith (2007:7) have put forward, it then should be considered a potential TCP until proven otherwise (also see M. Gage and J. Gage 2009b:6). As defined in National Register Bulletin 38, TCPs are eligible for inclusion on the NRHP because of their "association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (NPS 1998:1). One

type of TCP is "a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world" (NPS 1998:1), which would clearly include CSLs. Furthermore, because the aforementioned USET resolution states that their ancestors used "sacred ceremonial landscapes and their stone structures which are of particular cultural value," rock piles and other rock features that have been shown to be or are hypothesized as likely of Native American origin within the ancestral territory claimed by the USET, consisting of the eastern and southeastern portions of the United States (USET 2016), should be treated as TCPs and therefore are potentially eligible for inclusion on the NRHP, even in the absence of eligibility under the normal NRHP criteria.

Using the "process of elimination" approach, ASE hypothesizes that one of the rock piles found on Bear Knob (Rock Pile 4; Figure 5) is consistent with historic-period clearance cairns while the remaining 22 may be of prehistoric origin. Although a few features share characteristics with other historic-period types, no reasonable historic-period explanation could be found to justify the morphological and contextual homogeneity amongst 21 of the amorphous piles (Figure 6) or the unique construction of another (Rock Pile 5; Figure 7).

The 21 similarly constructed rock piles are composed of tabular sandstone cobbles and small boulders, all of which could be lifted by one or two people and most of which are stacked to at least some extent. The large majority of these piles occur in groupings of two or more. Most of the piles are oval or rectangular in plan view with their long axes oriented parallel to the contour. On average, the piles are 3.1 meters in length, 2.2 meters in width, and 0.4 meters in height. All of the rock piles are located on very steep upper hillslopes with 18 occurring between 1,500 to 1,600 feet of elevation. The terrain on which they sit, their patterning, morphology, and lack of any current or former houses on Bear Knob suggests that they were not built as clearance cairns, used in demarcating property lines,



Figure 6. Rock Pile 8 on Bear Knob (46UP342). This stacked feature was interpreted as possibly prehistoric. Photograph courtesy of ASE.

used for material stockpiles, built as "garden art," used in slope terracing, or built to open up pastureland. Although a few rock piles are located near logging roads, including one on the uphill side of a deep road cut, these piles appear no different from those that are not.

The remaining possible prehistoric rock pile (Rock Pile 5) is very neatly stacked with flush sides and a flat top, and it measures 2.9 meters in length, 1.9 meters in width, and 1.1 meters in height. A 5.5 meter long, haphazardly piled wall extends from its western side. Although this pile is near a road, due to its very careful construction, it is unlikely the product of road clearing, or for that matter the product of field clearance or stockpiling material. The absence of nearby

houses likely rules it out as "garden art." Because it stands alone, the pile is unlikely the product of clearing pastureland and it could not have functioned in slope terracing. The pile is unlikely a property marker as maps indicate that it does not lie on a property line.

The only pile hypothesized to be of historic-period origin (Rock Pile 4) is located near the edge of an abandoned field, is haphazardly piled, and is bisected along its long axis by an old woven wire fence. The pile measures 6.0 meters in length, 4.8 meters in width, and 0.3 meters in height. It was the only identified pile on Bear Knob to contain rounded cobbles and boulders in addition to the tabular rocks used to construct the other 22 piles. For these reasons, this pile is



Figure 7. Rock Pile 5 on Bear Knob (46UP342). This feature, interpreted as possibly prehistoric, represents the tallest and most well-stacked feature at the site. Photograph courtesy of ASE.

interpreted as an agricultural clearance cairn that functioned as a collection of all the rocks pulled from the adjacent field as opposed to just a deliberate selection of tabular rocks.

With the exception of this clearance cairn, the remaining 22 rock piles were deemed to be of possible prehistoric origin and the site was therefore regarded as a potential TCP (Moore, Weiss, and Collins 2015:106-107). This interpretation was further supported by the site's morphological and locational similarities to known prehistoric rock piles throughout the Upper Ohio Valley region, which are also constructed of native tabular sandstone, have a range of sizes and shapes, and seem to be most commonly found in upland settings such a ridge-

tops and upper hillsides, often overlooking aquatic features or other prominent natural features. Similar patterns are also found throughout the eastern United States (e.g., Deter-Wolf and Hockersmith 2007:3; Fowke 1900:193, 200-203; M. Gage and J. Gage 2009b:8; Holstein 2010:73-74; Strezewski 2004:38; WVAS 1994:1).

Case Study: 33BL485, OH (Conventional Excavation and Remote Sensing)

In October 2014, ASE conducted a Phase I and II archaeological survey in Belmont County, Ohio (Stathakis 2014; Figure 8), after several rock piles and a rock wall were identified near

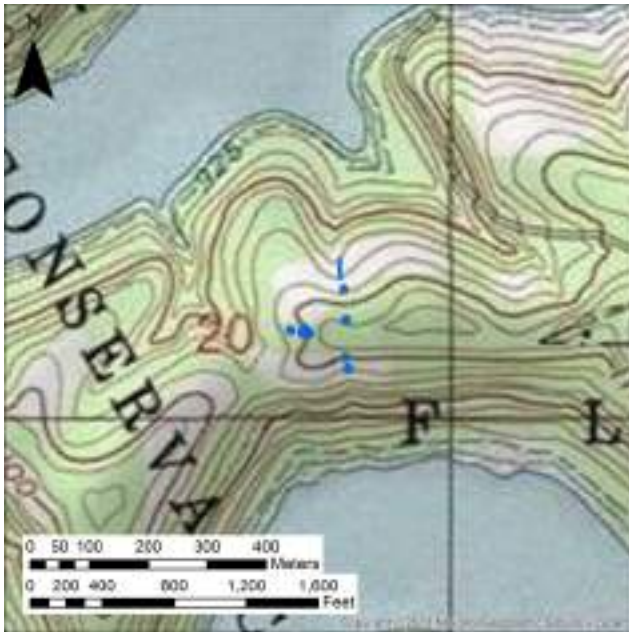


Figure 8. Distribution of features at 33BL485 on a 1998 USGS topographic map. Map courtesy of ASE.

the location of Native American burials depicted in Mills' (1914) *Archeological Atlas of Ohio* (Figures 9 to 11). Because Ohio has no resident, federally-recognized tribes, ASE was not able to consult with Native American groups prior to excavation. Shovel test probes (STPs) were excavated across the project area, three one-by-one meter test units were excavated at the center of three rock piles, and a magnetometry survey was conducted by Jarrod Burks of Ohio Valley Archaeology, Inc. (OVAI), an expert in geophysical survey, to see if these piles were associated with pit features or burned areas (Burks 2014; Figure 12).

The survey identified several magnetic anomalies representing either possible prehistoric pits or iron objects and corresponding to two-track roads and an old wire fence. Only one of the four rock piles covered by the survey possessed a magnetic signature (Rock Pile 7; see Figure 10), likely due to one or more iron objects (Burks 2014:17). A linear magnetic anomaly (Anomaly 3) extends from this pile to connect with a rock wall (Rock Piles 8 and 9; see

Figure 11), both of which correspond to a field edge in a 1960 aerial photograph and a LiDAR-based terrain model. This suggests that Rock Pile 7, the linear magnetic anomaly, and the rock wall are one-and-the-same. This collective feature was interpreted by ASE as a dump wall resulting from historic-period field clearance. The magnetic anomalies detected along this dump wall are likely due to iron objects, as a few were found during the Phase I archaeological survey within and near Rock Pile 7 (Burks 2014:16-18). The absence of Native American artifacts or features within or around the rock piles and the presence of a few historic-period artifacts, such as a hay rake tine and clear plow scars on one tabular stone (Rock Pile 7), further support that the rock piles and walls are historic period in age.

These apparent historic-period features could be interpreted using the formation model developed by Ives (2015:119-121; Figure 13), in which cairn fields, at least in New England, were built by nineteenth century farmers in order to maximize stony, hilly, and overgrazed pastures. However, it is important to note that many of Ives' hypotheses and observations are specific to the cairn fields he has examined in Rhode Island and to the economic history of New England and cannot necessarily be used to interpret rock features in the Upper Ohio Valley or other regions³. LiDAR and geophysical surveys have also been used successfully in other rock feature case studies, particularly to identify historic-period features like early farmsteads and terraces (e.g., Ives 2014; 2015:121; Eric Sipes, personal communication 2015). Such techniques are non-invasive, while still allowing the identification of subsurface rock features and associated cultural features.

*Case Study: Fort Drum, NY (Alignments and Indigenous Consultation)*⁷

Ongoing work by the CRM staff at Fort Drum, a U.S. military installation in Upstate New York, has revealed an impressive ceremonial prehistoric landscape that includes cairn



Figure 9. Rock Pile 4 at 33BL485. The feature consists of several stones piled on top of a large boulder. The feature was interpreted as a historic-period agricultural clearance cairn due to its association with others at the site, but has trace fossils on one of its stones. Photograph courtesy of ASE.

groupings and celestial alignments, as well as conventional archaeological sites (FDP 1151 and 1207). Celestial alignments were not accepted by the New York SHPO, or by many archaeologists in general, before the pioneering work of Laurie Rush, the base's cultural resource manager (Rush 2015; see Ballard and Mavor 2006). After realizing the potential significance of these sites, Rush worked closely with the fort's Native American consulting partners, who were able to identify many culturally-specific characteristics and provide interpretations for the rock features, such as oral traditions about what cairns commemorate, the existence of an observation seat, and a paired stone feature's alignment to the dog

star at a culturally significant time (Rush 2015; Laurie Rush, personal communication 2015). As Rush emphasized at the Philadelphia CSL conference, it is important to take into account when developing a research design or field methodology that many Native American groups are opposed to excavating rock features or within sacred landscapes. Their assistance should not be utilized without then respecting their beliefs.

Many of the indicators discussed by Rush and other panelists at the conference, such as Doug Harris of the Narragansett THPO, were noted or developed for the Fort Drum sites and are included in the description of prehistor



Figure 10. Rock Pile 7 at 33BL485. Due to its position along a field edge (per LiDAR, 1960 aerial imagery, and a magnetometry survey), the presence of a partially buried hay rake tine underneath the pile, and the presence of plow scars on one of its stones, the feature is interpreted as an historic-period agricultural clearance cairn. Photograph courtesy of ASE.

ic/native site indicators above. Rush also advocated for examining early historic-period or avocational/amateur archaeology accounts, as well as seeking out local and/or indigenous knowledge about the area, which can often be overlooked by archaeologists who are accustomed to the excavate-report schedule of CRM, with little time or money for thinking outside the box or seeking out additional information. At the same time, local information and oral tradition must always be critically examined. For example, the Adena C. L. Lewis Stone Mound was reported to be the result of field clearance by several locals (Kellar 1960:371). Two prior landowners of the Burton/Molina Farm site in West Virginia also give conflicting reports of the

rock features' origins (Maslowski and Miller 2015; Yolanda Molina, personal communication 2016). Scientific methods can be applied to verify native interpretations, such as probability maps to justify rock alignments or field observation of alignment events. While interpreting the Fort Drum sites, Rush (2015) used a university planetarium to reconstruct and check prehistoric skiescapes and paleoastronomic events against the alignments that had been identified during fieldwork (see Casella 2015). One of the alignments was also verified by an overnight event with members of the indigenous community.

Some of the native groups involved with Fort Drum are also part of the newly formed Ceremonial Landscapes Research, LLC (CLR),



Figure 11. A portion of Rock Pile 9 at 33BL485. This feature is interpreted as an historic-period dump wall related to agricultural field clearing. The feature measures 30.8 meters long and corresponds to a field edge depicted in LiDAR and 1960 aerial imagery. Photograph courtesy of ASE.

a THPO-sponsored group based in southern New England that was founded to assist THPOs and agencies with fulfilling Section 106 requirements (CLR 2015; Alexandra Martin, personal communication 2016). CRM archaeologists who are in need of CLR's expertise for consultation or training can contact them through or along with their THPO representative (Alexandra Martin, personal communication 2016).

Case Study: Constitution Pipeline, PA and NY (An Alternative CRM Approach)

A recent Phase I survey by AECOM for the Constitution Pipeline that crosses Susquehanna

County, PA and Broome, Chenango, Delaware, and Schoharie Counties, NY identified approximately 300 cairns in upland settings, all of similar shape and morphology (Cassedy and Bergevin 2015). Unsure of their origin, but still recognizing their potential significance, whether prehistoric or historic, the principal archaeologist, Daniel Cassedy, decided to term them "culturally sensitive," which conveys their significance without attaching a legal definition or process. This allowed the developer to avoid costly and time-consuming individual NRHP evaluations for these mysterious features "in exchange for" minimizing the impact to them through avoidance of the large majority of the piles.

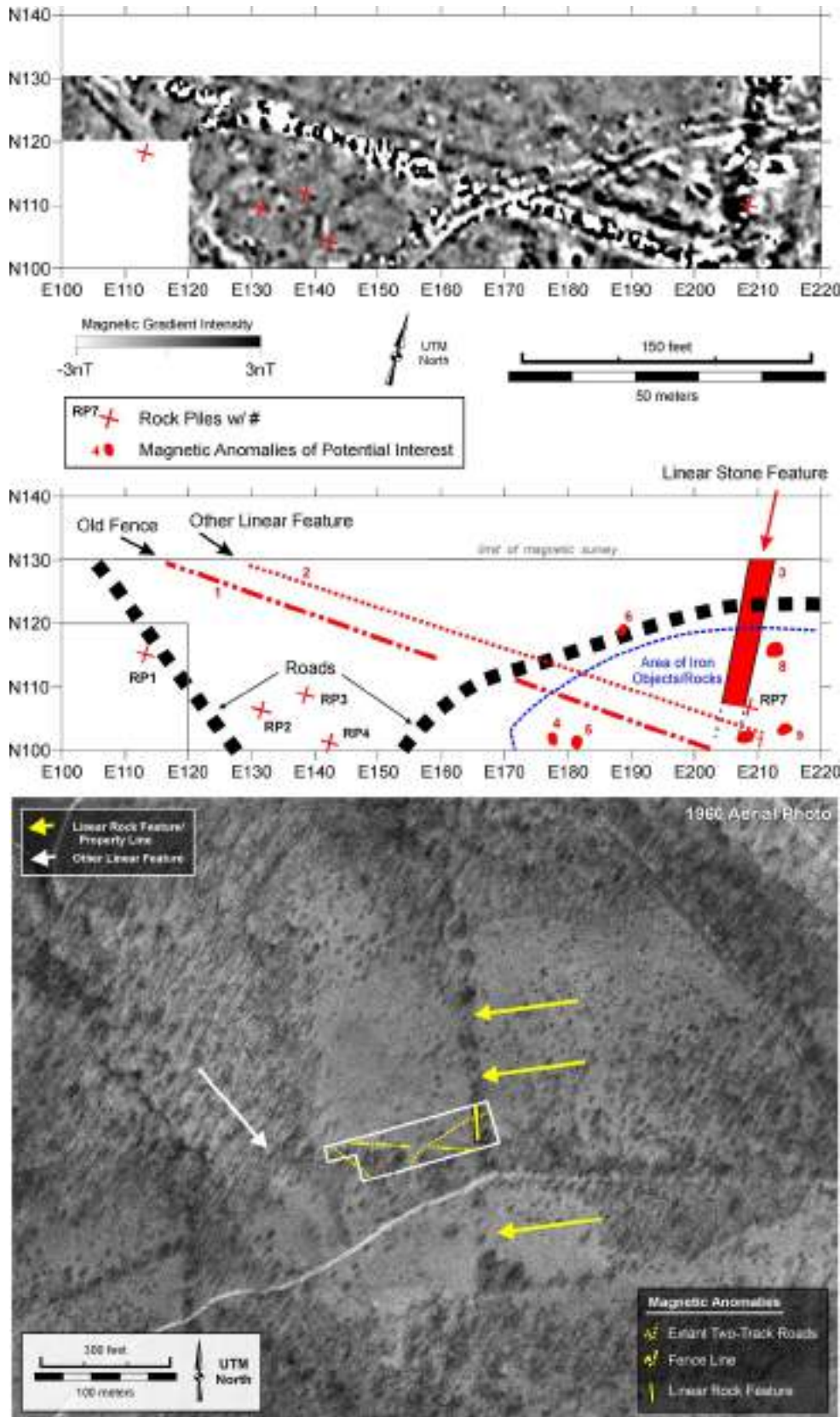


Figure 12. The top image depicts the results of the magnetic survey over a portion of 33BL485, while the middle image provides interpretations of the data (Burks 2014:15). Anomaly 1 represents the remains of an old wire fence running parallel to Anomaly 2, which is interpreted as either a path, utility line trench, or dead furrow. Anomalies 4-9 represent either prehistoric pits or iron objects, the latter being more likely according to Burks. Anomaly 3 is interpreted as a subsurface linear rock feature, associated with Rock Pile (RP) 7, which likely connects to a rock wall (RP 8 and 9) to the north. Overlaying the magnetic data on 1960 aerial imagery reveals that Anomaly 3 and the rock wall run concurrently with a field edge (Burks 2014:17) and likely represent a field or property boundary. Figure courtesy of Jarrod Burks and ASE.

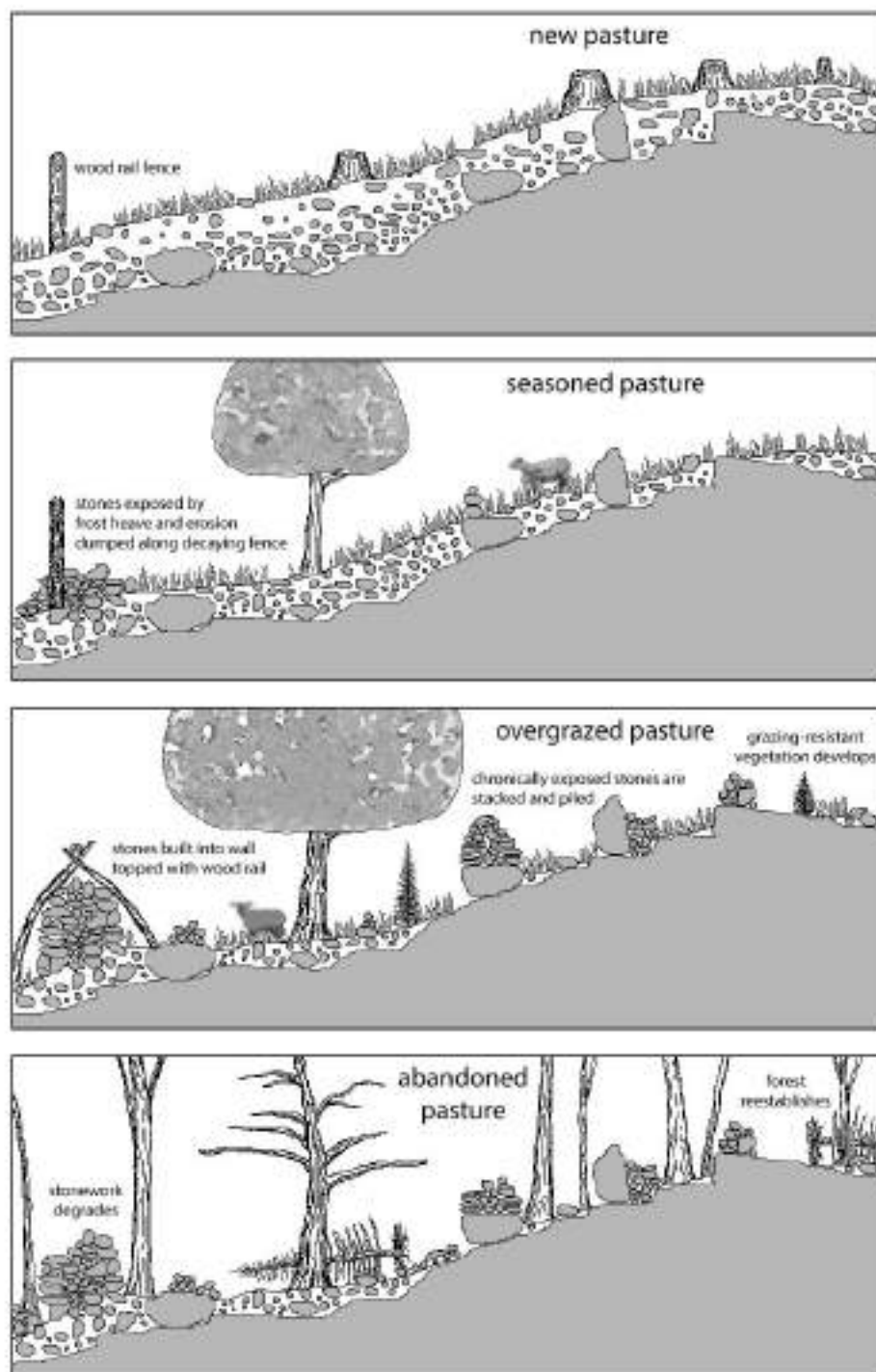


Figure 13. Ives' (2015:125-127) Four-Stage Cairnfield Formation Model. In stage one (top), trees are cleared to form fields and are used to build wooden fences. In stage two, stones that are brought to the surface from frost-heave and exposure of the soil to the elements are cleared from the fields to keep them open. The removed stones contributed to further erosion and were used to replace the older fences. In stage three, cairns are built within fields where soil erosion is allowed to continue through overgrazing. Because stone is no longer necessary for walls or other building projects, they are piled close to where they are removed to minimize transportation costs. In the final stage (bottom), pastures are abandoned and are overtaken by forests. Leaf litter from these trees reduces further erosion and frost heave. Figure courtesy of Timothy Ives.

While attempting to find the best approach, many creative excavation and mitigation measures were also considered, including 3D recordation, time-lapse photography as features were disassembled, and documenting different methods for a "lessons learned" package that could then be used by other archaeologists for similar sites (Cassedy and Bergevin 2015).

Contrary to other approaches and many SHPOs, Cassedy and Jesse Bergevin, a Historic Resource Specialist with the Oneida Indian Nation and part of the cairn evaluation process, argue that we cannot evaluate cairn integrity or NRHP-eligibility on a case-by-case basis, as it would be entirely arbitrary to say that groupings of 40 cairns are more significant than groupings of only a few cairns, or to determine when an individual cairn's integrity is too diminished to convey its significance. Furthermore, Bergevin argues that the term "TCP" is not appropriate in such cases, as the nation he represents no longer has traditional knowledge about the features, not to mention that some features may be historic (Cassedy and Bergevin 2015).

Rock Feature Forms and Guidance

With input from SHPOs and archaeologists, Mary and James Gage are currently developing a comprehensive but user-friendly form with guidance to assist with rock feature recordation (J. Gage and M. Gage 2015b; James of cairns and stone circles deriving from tipi rings to ensure that comparative data for later research is collected (MHS 2015). The form and guidance for documenting stone circles includes many descriptive terms and recordation items that are widely applicable to any rock feature type (e.g., number of visible surface rocks; rock shape; azimuth). North Dakota SHPO's chief archaeologist believes that rock piles should be recorded "based on guidance and [professional] judgment that takes into account the presumed age, function, and cultural affiliation of the [features] in question" (Paul Picha, personal communication 2015). They have also developed a specific form for recording cairns and other rock

Gage, personal communication 2015). Extensive research regarding rock feature classifications and terminology, prehistoric and historic-period activities resulting in rock feature construction (especially CSLs, agriculture, and quarrying), and northeastern rock features in general is available on their website (J. and Gage 2015a), stone structure handbook (M. and J. Gage 2015), and other publications. Type-specific forms also are included on the website and in the handbook (2015).

Of the SHPOs who responded to our inquiries, only the Montana, North Dakota, and Oregon SHPOs readily recognize many rock features as being of Native American origin and use rock feature-specific forms and guidance to assist CRM archaeologists in their identification, recordation, and NRHP assessments. These SHPOs also recognize the potential significance of historic-period rock features and record all that are more than 50 years old (MHS 2015; OPRDOH 2015; SHSND 2015). As discussed above, many other SHPOs do emphasize a site-specific research approach, which requires each rock feature to be individually evaluated against the NRHP criteria; however, no special consideration or guidance is provided for rock features. The Montana SHPO recognizes that, even with excavation and tribal consultation, determining the origin and function of rock features is not always possible. Therefore, they have developed field forms to record the physical attribute features as potential TCPs (SHSND 2015). The Oregon SHPO has developed a systematic approach in the form of a rock feature-specific flow-chart that is used to identify appropriate research, types of data to collect, and NRHP-eligibility (OPRDOH 2015). This chart ensures thorough documentation and includes many types of prehistoric and historic period rock features that are considered potentially eligible for the NRHP, particularly when they are part of larger sacred or activity-oriented landscapes (OPRDOH 2015). Under this chart, prehistoric rock features are treated as eligible until tribal consultation is complete and their purpose is assessed. These forms are available on the respec-

tive SHPO websites.

A Call for the Adoption of Rock Feature-Specific Guidance and the Application of Archaeological Theory

As noted above, understanding rock features can begin with the simple step of including them in SHPO inventories of archaeological sites whenever they are encountered. Just acquiring a state trinomial site number promotes the sharing of information and legitimizes features as cultural resources. Inventories can be expanded through reviews of existing literature and ongoing fieldwork. Due to the uniqueness of rock features, any shortcomings in the current systems of field documentation can be more easily identified, allowing multiple states' inventories to then be more easily compiled. From there, rock feature categories can be more accurately defined and subdivided and specific guidance can be developed by archaeologists, SHPOs, and other agencies or groups.

When rock feature sites are regularly recorded in a thoughtful, knowledgeable, and consistent way, we will be able to identify meaningful patterns and can then truly begin to explore this aspect of the past through the application of archaeological theory, such as Tilley's (1994, 1996) phenomenology of landscape, Boivin and Owoc's (2004) work on perceptions of the mineral world, and Ingold's (2000) dwelling perspective⁸. Ingold's work is particularly applicable, as it can be used to explore the affordances (which are perceived properties and use-values) of stone, individual stone constructs, and the environmental settings of rock features in order to develop possible meanings and reasons behind their construction. For example, the affordances of a stone include its color, texture, workability, provenience, shape, luster, mythological associations, usefulness as a tool, stackability, potential to kill, obstacle to plowing, use as an artistic medium, or ability to block visibility.

These predominantly British theoretical approaches, which could be collectively subsumed under the study of "paleo-environmental inhabi-

tation," or, "what it was like to actually *be inside*, or 'inhabit,' past environments" (Moore 2012:1), are readily applicable to North American rock features and can open up exciting new avenues of research. For example, Trevarthen's (2000) study of prehistoric cairns demonstrated how geological affordances like color and luster can convey ideology and William's (2007) study of medieval cemeteries revealed how burial cairns and other mortuary and commemorative monuments were carefully designed by the living to selectively reflect individual and collective identities and relationships. Johnston's (2001) work on prehistoric clearance cairns explored the ways in which cairns structure both the physical and social realm. Bradley's (1998) article on megalithic tombs argues that prehistoric people may not have distinguished between built features and visually similar rock outcrops.

Framed and intersected by navigable water and ancient travel routes, the Upper Ohio River Valley has been a geographic center for economic and cultural development spanning Native American cultures like the Hopewell, early European American settlement and agriculture, nineteenth-to-twentieth century industry, and the current oil and gas boom. As people built rock features, in all their forms, functions, and origins, they were reflecting a shared, ever changing, understanding of human experience and interactions with the materiality of landscape (e.g., augmentation, imitation, interaction, modification of existing conditions). However, until all archaeologists, SHPOs, and agencies begin to adopt region-appropriate guidance and best practices, guided by some of the techniques and resources discussed, and to respect indigenous beliefs about the agency of landscape features and their ancestors (e.g. Holstein 2010), this information will continue to be unreachable.

Endnotes

1. This article was prepared by the authors in their personal capacity. The views and methodology described here do not necessarily reflect

those of AllStar Ecology, LLC (ASE). However, the authors would like to acknowledge ASE for granting permission to use photographs taken during fieldwork and for the use of ASE's ArcGIS license.

2. Under Section 106 of the National Historic Preservation Act (NHPA), development which involves federal land, funding, or permitting must be evaluated for its potential to negatively affect significant cultural resources (see ACHP 2011). Any identified cultural resources are evaluated against the criteria laid out in 36 CFR 60.4 and any adverse effects must be avoided, minimized, or mitigated upon consultation with SHPO and other relevant parties.

3. James and Mary Gage and some other New England researchers dispute the historical facticity of Timothy Ives' (2015) description of stone clearance for pasture, arguing that no primary sources describe this practice and that it would not have been an economical labor investment (James Gage; Mary Gage, personal communications 2016; see J. Gage 2014, M. Gage 2015).

4. In 2011, Bob Maslowski and Roger Wise were invited by the current landowner, Yolanda Molina, to examine a series of rock walls, piles, and other features (Yolanda Molina, personal communication, 2016). In a subsequent presentation (Maslowski and Miller 2015), Maslowski referred to the site as the Burton Farm, after a prior landowner who he believed had built the features. During a series of emails and conversations between the authors and Ms. Molina, she emphasized that her exploration of the property indicates that they were more likely built by prehistoric peoples, not Mr. Burton, and that she therefore prefers that the site be referred to as the Molina Farm.

5. Since the date of this article's initial submission, ASE recorded the Lough Rock Feature Site (46TY88) in northwestern West Virginia using several such methods. This site was interpreted as a historic-period field clearance cairn field.

In May 2016, the West Virginia SHPO concurred that the site was not NRHP-eligible because the investigation had exhausted the site's research potential. The archaeological site form, which includes detailed maps, photographs, and descriptions of the utilized methods, is available through the SHPO.

6. This information is provided for educational purposes and should not be considered an endorsement by the authors. Native beliefs regarding CSLs should be respected during the development of field methodologies.

7. Prior to discussing these sites publically, Fort Drum's cultural resources branch consulted with its Native American partners regarding their use as examples in scientific discourse.

8. Ingold (2000:153) defines the "dwelling perspective" as "a perspective that treats the immersion of the organism-person in an environment or lifeworld as an inescapable condition of existence. From this perspective, the world continually comes into being around the inhabitant, and its manifold constituents take on significance through their incorporation into a regular pattern of life activity," versus a conventional, Western "building perspective," which says that people first build, then live in their environments.

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