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Source: *Midcontinental Journal of Archaeology*, Summer 2015, Vol. 40, No. 2 (Summer 2015), pp. 134-148

Published by: Taylor & Francis, Ltd. on behalf of the Midwest Archaeological Conference, Inc.

Stable URL: https://www.jstor.org/stable/10.2307/26599914

MIDCONTINENTAL JOURNAL OF ARCHAEOLOGY, Vol. 40 No. 2, Summer, 2015, 134–148

Determining the Age of GLO-mapped Trail Networks: A GIS Analysis of Northern Iowa

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Between 1833 and 1861, the Government Land Office (GLO) mapped almost 11,000 km of trails in Iowa. It is unknown if substantial portions of this GLO-mapped trail system predate the arrival of Euro-Americans; it is possible they were established in prehistory and used into the historical period. This Geographical Information Systems study compares a sample of archaeological sites within 1 km of the GLO trails in northern Iowa with a control sample. It was expected that GLO trails would be more common near Late Prehistoric sites if much of the GLO trail system was established before Euro-American arrival. Analysis indicates a relationship between GLO-mapped trails and Late Prehistoric, early historic Indian, and early historic Euro-American sites. Statistically, the connection between GLO trails and early historic Euro-American sites is by far the strongest; however, biases in the data suggest the association between Late Prehistoric and early historic Indian sites and GLO trails is underestimated.

KEYWORDS Iowa, GIS, GLO-mapped trail system

Almost all of Iowa's existing roadways were built after 1850; the familiar 1-mile grid of checkerboard township roads crossed by state and federal highways emerged after the state was surveyed by the U.S. Government Land Office (GLO) in the years 1833–1861 (Kelsay and Pernell 1971; Lokken 1942). However, this network was superimposed on a much older system of trails used by early settlers, traders, military, and American Indians.

Early explorers sometimes noted substantial trail systems in Iowa, such as the *Chemin des Voyagers*, a network of trails used since at least the 1700s that served as an overland route connecting the mouth of the Wisconsin River with the Missouri River (Figure 1). It was used by Indians, fur traders, the U.S. Army, and early settlers (Whittaker and Doershuk 2010). Older trails often were mapped by GLO surveyors before those trails were abandoned (Figures 2 and 3). The GLO-mapped trails

 DOI 10.1179/2327427114Y.0000000019

FIGURE 1 Example of early trail system documented in Iowa. Portion of 1718 Delisle map showing trails crossing Iowa. The northernmost is probably the *Chemin des Voyageurs*, connecting the "*R. des Kicapou*" (now the Upper Iowa River) with the villages of "*les Aiaouez, Paoute, et Otoctata,*" Ioway, and Otoe villages near Lake Okoboji. South of this, an east–west trail connects the mouth of the Wisconsin River with the Missouri River. A third trail is shown running along the east side of the Mississippi River (Whittaker and Doershuk 2010).

typically do not follow compass directions but instead appear to follow natural routes dictated by topography and obstacles, running along ridge tops, curving around wetlands, and winding down drainages to river bottoms where they cross natural fords.

Were these trails built by the early Euro-American explorers and settlers, or were early settlers using a preexisting trail system? Since Iowa displays continuous human occupation from at least the Late Prehistoric period through the historic period (Alex 2000; Foster 2009), it seems logical that useful trail systems would be reused by whatever group occupied the region, and advantageous trails that covered long distances efficiently would remain in use even if smaller trails leading to abandoned villages and depleted resources disappeared.

This paper compares archaeological site location data in northern Iowa with GLO-mapped trail location data to examine the relationship between site occupation periods and proximity to GLO-mapped trails. If the early trail system was substantially constructed in the Late Prehistoric period, there should be a spatial correlation between Late Prehistoric sites and GLO-mapped trails.

The GLO maps have been used for a number of ecological studies of Iowa at the time of settlement (e.g., Anderson 1996; Miller 1995), a practice that is not without controversy when applied to archaeological research (King 1978). There are

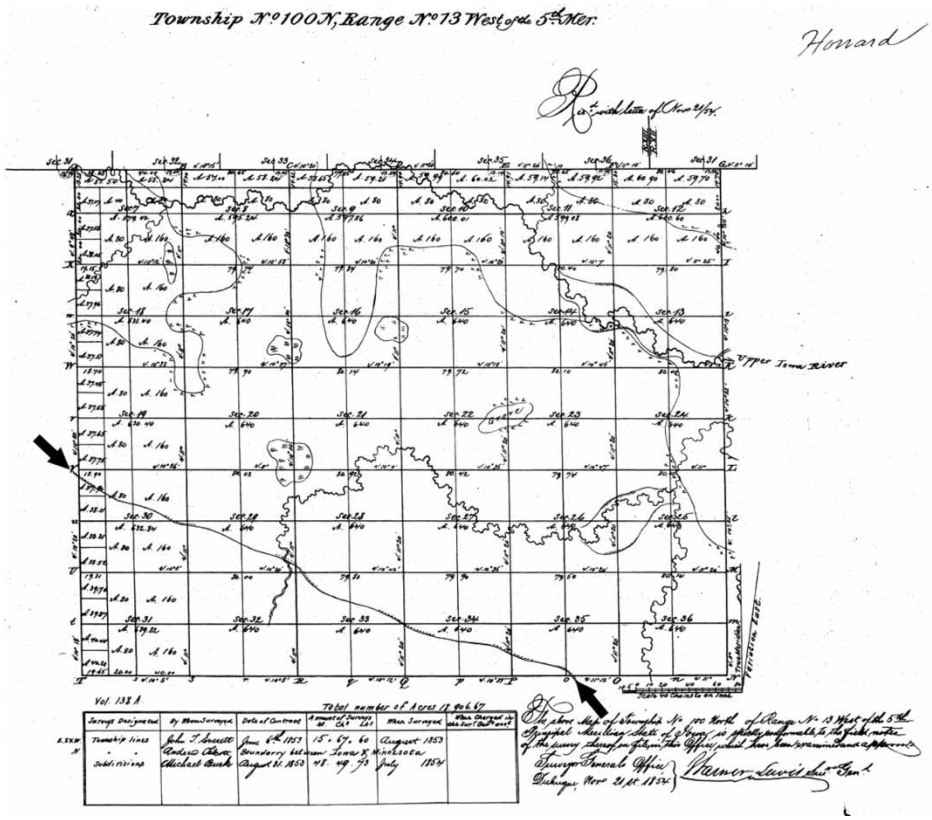

FIGURE 2 Example of a U.S. Government Land Office map, T100N-R13W, west 5th Meridian, now in Howard County, Iowa, where the Upper Iowa River leaves Minnesota. Mapping occurred August 1853 and July 1854 and was formally recorded November 1854. Arrows indicate the ends of a mapped trail.

numerous studies of Indian and early historical trail systems in the Midwest that primarily focus on finding traces of them or discussing their significance (e.g., Blakeslee and Blasing 1988; Christensen 1934; Faux 2006; Hanson 1987). Geographical Information Systems (GIS) analyses of archaeological site location from the Iowa Site File has been used by several researchers to predict locations suitable for mounds and other prehistoric sites (Artz et al. 2006; Goings 2010; Kendall 2007; Riley 2009; Whittaker and Riley 2012). There appears to be little or no published analyses of GLO trails and archaeological sites, probably because there are few states with both digitized GLO maps and digitized site files.

Previous Indian trail research

Buffalo trail hypothesis

The complex networks of trail systems attracted the attention of early explorers and surveyors in North America. Early theories explaining the origins of trails relied on

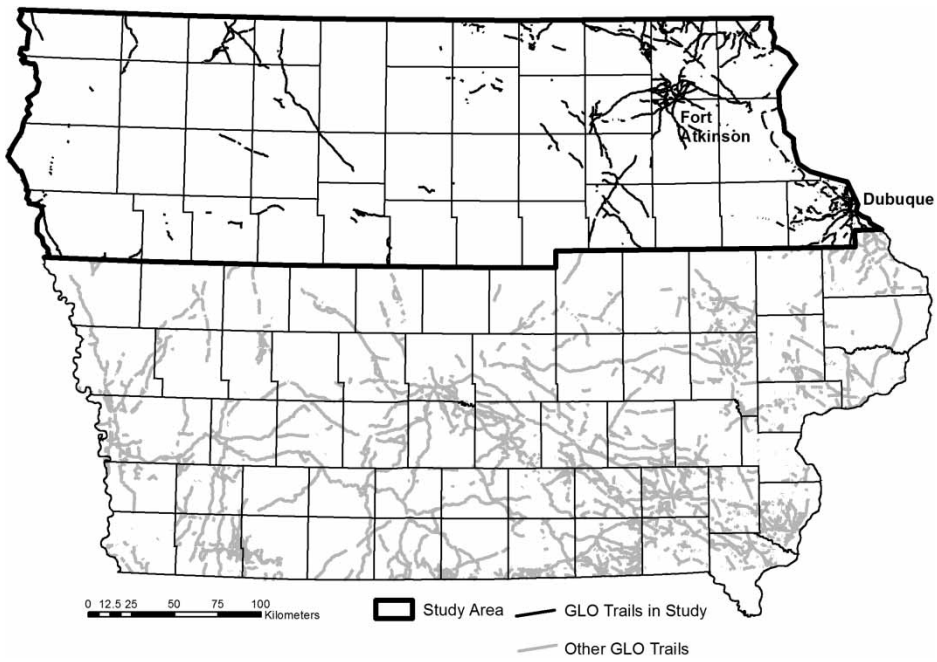

FIGURE 3 Trails mapped in Iowa by the Government Land Office (GLO) (1833–1861) and the study area. There are 2,218.8 km of GLO-mapped trails in the study area, which is about 20 percent of the 10,949.5 km of GLO-mapped trails in the state.

the same sets of racist precepts used to belittle other Native American accomplishments such as mound building. This bias is typified in the speeches of U.S. senator Thomas Hart Benton, arguably the father of the American West. His significance is largely forgotten, but Benton was the main author and supporter of the principles of Manifest Destiny, the designer of the Homestead Acts, and the earliest booster of intercontinental railroads (Meigs 1904). Benton, not surprisingly, disparaged the idea that Native American trail systems were significant or even necessarily made by Indians, an idea that resonated with early historians. For example, the 1878 *History of Van Buren County, Iowa* reported that

> An interesting theory respecting the origin of the routes now pursued by many of our public highways is given in a speech by Thomas Benton many years ago. He says the buffaloes were the first road engineers, and the paths trodden by them were, as a matter of convenience, followed by the Indians, and lastly by the whites, with such improvements and changes as were found necessary for civilized modes of travel. It is but reasonable to suppose that the buffaloes would instinctively choose the most practicable routes and fords in their migrations from one pasture to another. Then, the Indians following, possessed of about the same instinct as the buffaloes, strove to make no improvements, and were finally driven from the track by those who would [Western Historical Company 1878:382–383].

Benton may have been the most famous proponent of the buffalo-trail theory, but the most-cited proponent of the idea that Indians were constitutionally incapable of making a trail was Archer Butler Hulbert, who produced a series of books about early American trails and roads that were generally free of citations or data other than anecdotes. Hulbert barely granted Indians the ability to build mounds, by then a settled debate, and he felt them incapable of building major trails. Instead he, like Benton, thought Indians simply followed buffalo trails.

> So far as we know these early peoples [mound builders] built no road between their forts or between their villages. They made no thoroughfares. It was for the great game animals to mark out what became known as the first thoroughfares of America. The plunging buffalo, keen of instinct, and nothing if not a utilitarian, broke great roads across the continent on the summits of the watersheds, beside which the first Indian trails were but traces through the forest. With the deterioration of the civilization to which the mound-building Indians belonged, the art of road-building became lost—for the great need had passed away [Hulbert 1902:19, 22].

Neither Benton nor Hulbert addresses the greatest flaw in the buffalo-trail hypothesis: bison and deer have different motives for making trails than humans do. Grazing and browsing mammals made trails to access resources important to them, such as grassland or woodland-edge forage, and bison made long-distance migratory trails from one region to another to find better seasonal forage. Humans made trails between resources important to them, such as fishing spots, crop and garden fields, sugar groves, river crossings, neighboring villages, seasonal camps, and wetland hunting areas. These human routes likely have little overlap with deer and bison trails except, perhaps, when extreme topographic restrictions funnel all large-mammal traffic, such as is the case in a narrow ravine or along a tenuous river terrace.

Modern trail studies

In the late twentieth century, studies of Indian trails acknowledged human agency and began to look for discernible patterns in trail placement and how they might relate to prehistoric and early historic Indian sites. Malouf (1980) proposed general hypotheses about the placement of Indian trails in the high northwestern Plains, where there is stark topographic relief that limits trail placement. Blakeslee and Blasing (1988) studied long-distance trails in the central Plains, concluding that they probably stuck to upland divides, and explored the types of historical and archaeological evidence that would indicate trail systems. Interestingly, they found evidence that sites, including those consisting of cairns, villages and camps, or petroglyphs, were situated to be near long-distance trails, rather than long-distance trails leading to sites.

A notable use of GIS to study early historical trails in Iowa is Whelan's (2003) analysis of the 1837 No-Heart map, which depicts the movements of the Ioway tribe across the region. Whelan found correspondence with historically known Ioway sites and geographical features, including possible trails.

More recent research on indigenous trail systems from around the world uses least-cost path analysis, typically employing archaeological and historical data to try to determine possible routes rather than to determine the relationship between known trail locations and sites (e.g., Anderson 2012; Kantner 1997; White 2012). Least-cost path analysis typically relies on determining the amount of impediment caused by topography and other physical features when creating the most efficient routes between points (Chang 2012:379–385) and, therefore, is of limited use when the route is already determined, such as on GLO-mapped trails.

Methods

This project proposes that geographical proximity of archaeological sites to GLO-mapped trails informs trail age. For example, if the GLO trail system was largely built during the Late Prehistoric Oneota period, a random selection of sites very close to the trail will have a far greater proportion of Oneota sites compared with a random selection of sites from the area as a whole. This analysis necessarily ignores topography; it is not a least cost path analysis and compares only the location of sites with the mapped locations of GLO trails.

This study is limited to the northern four tiers of Iowa counties, which include 42 counties and 40 percent of Iowa's total area (see Figures 3 and 4). This part of Iowa was chosen because it was largely unsettled by Euro-Americans when GLO mapping occurred (Anderson 1996) and, therefore, is more likely to express connections between Late Prehistoric Indian or protohistoric Indian and GLO trails than is the

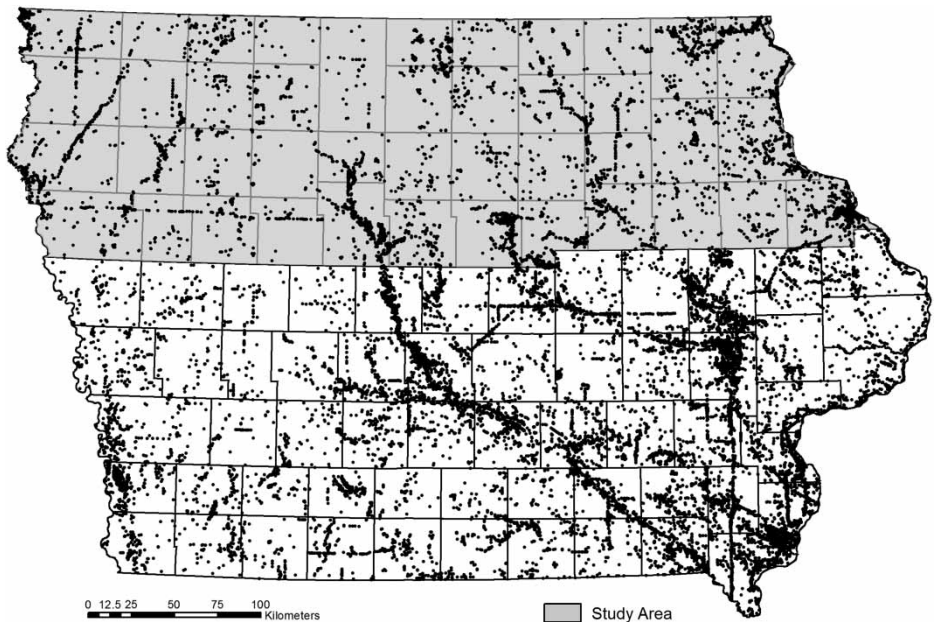

FIGURE 4 Archaeological sites recorded in Iowa. There are about 26,000 sites recorded in Iowa, of which 7,218, or roughly 28 percent, are within the study area.

southern part of Iowa, which was largely settled by Euro-Americans when its GLO trails were mapped. The northern part of the state is not without scattered Euro-American settlers, and there were two areas with comparatively large settlements, the town of Dubuque and the military post at Fort Atkinson (Carr and Whittaker 2009), but as a whole, the region was sparsely settled. There are 2,218.8 km of GLO-mapped trails in the study area, about 20 percent of the 10,949.5 km of GLO-mapped trails in the state. The GLO maps and their trail system were previously digitized by Artz and Riley (2008, 2011). The locations of archaeological sites are digitized in maps maintained by the Office of the State Archaeologist (OSA) at the University of Iowa. Within the study area, there are 7,218 recorded archaeological sites, roughly 28 percent of the approximately 26,000 recorded sites in Iowa (see Figure 4).

A GIS analysis was undertaken using ArcMap 10.1. A 1-km (.62-mile) buffer was produced around all GLO trails in the study area, and a list of all sites within the buffer was created. The 1-km boundary was chosen because it was greater than .5 miles (.8 km), the expected maximum error of GLO survey maps. GLO surveyors typically mapped the perimeter of the 1-square-mile sections, but not the interior of the sections; if features on the interior of the section were mapped, they were approximated, and the farthest distance a feature could be from the mapped perimeter is the center point, or .5 miles away. Within 1 km of the study area's GLO trails, there are 1,377 recorded archaeological sites.

Random samples of 500 sites were made from the 1-km-GLO-trail buffer and 500 from the study area as a whole, using a random number generator. Since 96 sites overlapped in both samples, the total number of sites in the study was 904. The quantity of 500 sites per sample was chosen because it was larger than the 449 sample size needed to achieve a 99 percent confidence level with a 5 percent margin of error of the GLO trail sample of 1,377 (Creative Research Systems 2013). In addition to 500 being a statistically meaningful sample, it was not productive to include all 7,218 sites in the project; analysis of a site took about 5 min, which if all sites had been analyzed would have translated into 15 weeks of additional research for a minimal increase in statistical confidence.

Once the site sample was created, the occupation age of each site was determined through researching the Iowa Site File maintained by the OSA, including scanned paper site forms for sites recorded prior to ca. 2004 and the digital site file for later sites. If a site designation appeared implausible, contradictory, or confusing, original research reports were consulted. While this reliance on the site file was necessary to make the study feasible, it should be noted that detailed research reports, which were not typically explored, sometimes have better information about site occupation periods than the site file does.

Sites were coded by time period primarily based on diagnostic artifacts. Historical research for later sites was also used if this information was available on the site form, and a few of the sites had radiometric ages. Sites could have multiple designations reflecting multiple occupations. Listed here are the general time periods used for this report, based on Alex (2000). The locations of sites within the study area are shown in Figure 4.

Unidentified prehistoric: This category includes sites that contained no temporally diagnostic artifacts, such as a site that has only flaking debris and heated rock, or sites that were simply noted as prehistoric in the site file without explanation.

Archaic or Paleoindian: Sites in this group had artifacts or radiometric ages from the Archaic or Paleoindian periods, roughly 13,000–3,000 years ago. Because of small numbers (Paleoindian = 10, Archaic = 39), they were combined in this analysis.

Woodland: This group includes sites with artifacts or radiometric ages from the Woodland period, roughly 3,000–900 years ago.

Woodland or Late Prehistoric: Sites where the only temporally diagnostic artifacts date to either the Woodland or Late Prehistoric periods are placed in this broader category. Such artifacts include ceramics with no diagnostic decorations or attributes, small triangular arrowheads (e.g., Bradbury and Richmond 2004), or conical mounds (e.g., Betts 2003).

Late Prehistoric: This period includes sites with artifacts or radiometric ages from the Late Prehistoric period, roughly 900–300 years ago. Shell-tempered ceramics are probably the most common diagnostic artifact from this period.

Protohistoric or early historic Indian: Protohistoric Indian sites are Indian sites not recorded by contemporary Euro-Americans but that contain Euro-American trade goods; these sites typically date to after 1650 but before 1800 (e.g., Doershuk and Resnick 2008; Whittaker and Anderson 2008). Early historic Indian sites are sites possibly noted or mapped by contemporary Euro-Americans; these sites were typically occupied after 1800 but before Indian removal was largely completed in 1851 (Foster 2009). Because of the relatively small number of both groups, and the difficulty distinguishing between them, they are combined in this analysis.

Early historic Euro-American: Sites with artifacts or historic documentation that indicates they were occupied before ca. 1860, when the GLO mapping was completed, are classified as early historic Euro-American. Many of these sites were defined as early historic because they are shown on the GLO maps; the overrepresentation of these sites is discussed below.

Other historical sites: This group includes sites with artifacts or historic documentation that indicates they were occupied after ca. 1860. It also includes historical sites with artifacts of ambiguous age, such as a site described as a "brick and crockery scatter" or simply a "foundation." It is possible that some of these sites are early historic occupations.

Limitations of analysis

Synthetic data analyses often have profound limitations resulting from disparate data sources; these limitations cannot be controlled for easily. The time periods presented here are poorly bounded, blending as one ends and another begins, and boundaries are only approximate. The reliability of the determination of site age varies from site to site. For some sites, age of occupation is well established, with numerous diagnostic artifacts supported by radiometric ages. Other sites simply have the word *Woodland* noted on the site form, with no explanation. Site forms

were filled out by dozens of people over 50 years' time, so there is little consistency in how information was collected or presented, and the types of information the site forms include change over time. Site recorders include amateurs interested only in large prehistoric sites, as well as professionals obligated to record all sites, even those represented by isolated prehistoric flakes and twentieth-century trash scatters.

Many early historic Euro-American sites were recorded because they appear on GLO maps, but they may not have been confirmed by field visits. This likely increases the number of early historic Euro-American sites relative to other sites, but it should not distort the chance of Euro-American sites being close to GLO trails, since GLO surveyors did not survey along the old trails, but rather along section lines.

There is the inevitable problem of resolving the relationship between correlation and causation. In Figures 3 and 4, it is clear that both archaeological sites and GLO trails are more common in the eastern part of the study area; however, it is not clear if this correlation is real and, if so, that it is caused by the same factors. The general dearth of archaeological sites has long been noted in north-central Iowa, which is dominated by the Des Moines Lobe landform, a late glacial area that was rich in wetlands until settlement. It is unclear if the lack of known sites is because prehistoric people were less likely to live there or because sites are simply too difficult to find readily (Lensink 1984). GLO trails may also be less common in north-central Iowa because there were fewer people there prehistorically or because the trails became quickly overgrown and vanished if abandoned for a short period of time.

Another possible cause of general correlation between GLO trails and sites is that sometimes modern roads appear to follow old GLO trails, especially in the high-relief northeastern part of the state, and site recorders are perhaps more likely to record sites along modern roads.

Results

Table 1 summarizes the results, presenting the raw site-count data. In the raw data, the largest numeric difference between the sample of sites within 1 km of the GLO trails and the control sample is that far fewer unidentified prehistoric sites are recorded near GLO trails: 184 vs. 247 ($P = .0003$). This was the most surprising result. A possible explanation is that larger sites are more likely to need large trail systems, and larger sites are also more likely to produce artifacts, including more temporally diagnostic artifacts, whereas smaller sites are less likely to have required the creation of large trail systems and are also less likely to produce artifacts. This scenario would create a correlation between GLO trails and sites with diagnostic artifacts.

Table 1 also shows that sites near GLO trails are far more likely to have Late Prehistoric and early historic sites than the control sample, with 1.7 times as many Late Prehistoric sites, 5.3 times as many early historic Indian sites, and 2.6 times as many early historic Euro-American sites. This is shown graphically in Figure 5, which compares the percentage difference between the GLO trail site sample and the control sample. If there was no relationship between GLO trails and the age of

TABLE 1

COUNTS OF SITES IN BOTH SAMPLE GROUPS

	Archaic or Paleoindian	Woodland	Late Prehistoric or Woodland	Late Prehistoric	Early Historic Indian or Protohistoric	Early Historic Euro-American	Other Historic Euro-American	Unidentified Prehistoric
Sample of 500 sites within 1 km of GLO trails	28	50	31	38	21	77	121	184
Control sample of 500 sites	25	50	40	22	4	30	105	247
Percent difference between sites near GLO trails and control	112.0% (P = .10)	100.0% (P = .08)	77.5% (P = .06)	172.7% (P = .01)	525.0% (P = .00037)	256.7% (P = .000001)	115.2% (P = .03)	74.5% (P = .0003)

Note: Total sites within each sample add up to more than 500 because individual sites can have multiple occupations, and sites can be in both the GLO-trail sample and the control sample. Probability is 2-tailed P-value.

sites, the lines would be close to 100 percent, as they are in the Paleoindian/Archaic, Woodland, and Woodland/Late Prehistoric periods. However, the percentage difference increases in the Late Prehistoric period and continues into the early historic era. Taken at face value, this would suggest the GLO-mapped trail system is more strongly associated with historic Indian sites and less so with the early historic Euro-American period sites.

Two-tailed P values reveal a logarithmic decrease in the probability of sites being close to GLO trails over time; Paleoindian, Woodland, and Late Prehistoric or

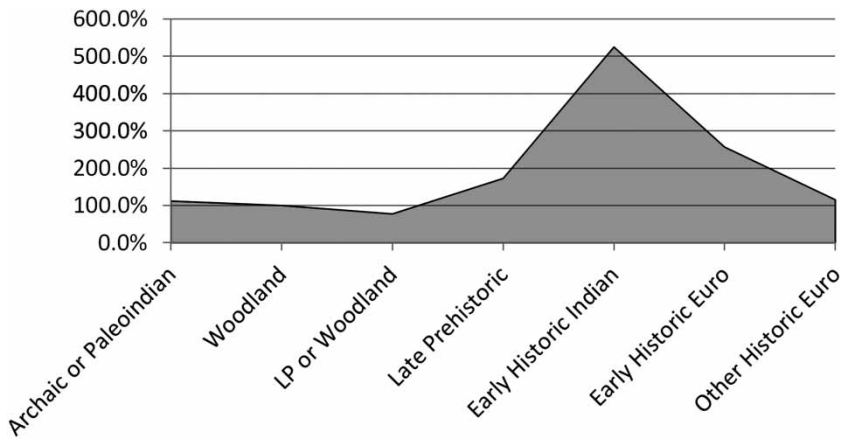

FIGURE 5 Percentage difference between sites within 1 km of GLO trails and the control sample, using data from Table 1. If there was no association between a time period and proximity to GLO trails, percentage difference would be 100.

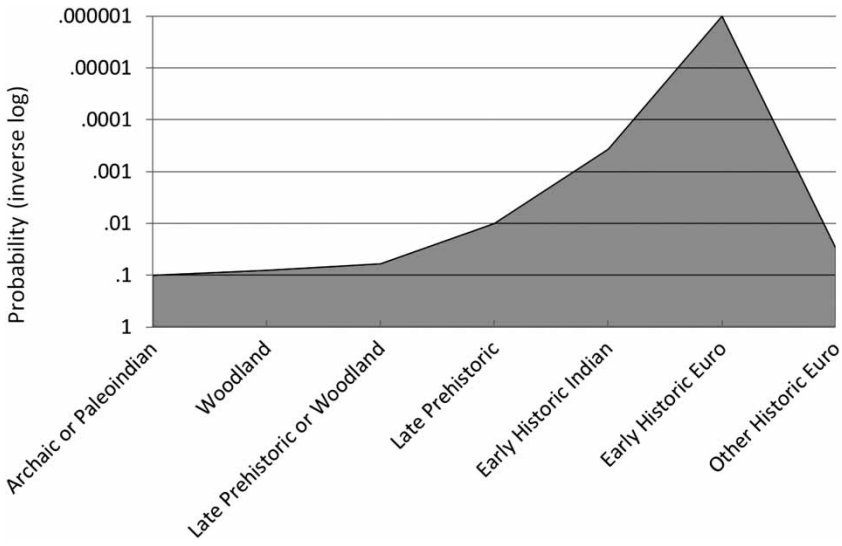

FIGURE 6 Probability (2-tailed *P* value) of variation between control and sample, shown as an inverse log to illustrate the extremely low probability that the difference between numbers of Late Prehistoric, early historic Indian, and Euro-American sites near GLO trails against those of a control group is random chance.

Woodland sites have comparatively high probabilities ($P > .05$), meaning there is no real discernible preference for the placement of GLO trails near these older sites (Figure 6). In contrast, Late Prehistoric, early historic Indian, and early historic Euro-American sites have low probabilities ($P \leq .01$). Two site groups, early historic Indian and early historic Euro-American, have extremely low probabilities ($P < .001$), revealing a strong relationship between GLO trails and early historic sites.

Although these results indicate Late Prehistoric and early historic sites are correlated with GLO-mapped trails, and that the relationship is far stronger with early historic Indian and Euro-American sites, this does not take into account the large difference in raw number of sites. There are 3.7 times as many early historic Euro-American sites within 1 km of GLO trails as there are early historic Indian sites, so inhabitants of the former might have been responsible for more of the trail system than inhabitants of early historic Indian sites were. Furthermore, the very small number of early historic Indian sites in the control group ($n = 4$) is likely distorting the importance of the small number of early historic Indian sites within 1 km of the GLO trails ($n = 21$).

Data normalization can be based on the number of sites per time period to remove the exaggeration caused by the low number of early historic Indian sites in the control group and to approximate the percentage of trails that each time period corresponds with. Table 2 normalizes data from the three time periods with very low probability ($\leq .01$): Late Prehistoric, early historic Indian, and early historic Euro-American. Data were normalized using the lowest site count, that of early historic Indian. Different multiplier values were derived for each period: for example, Late

TABLE 2

NORMALIZATION OF DATA FOR SAMPLE SIZE USING EARLY HISTORIC INDIAN SITE COUNTS

Total Sites	Late Prehistoric	Early Historic Indian or Protohistoric	Early Historic Euro-American	Total
Site within 1 km of GLO trail sample	38	21	77	136
Site control sample	22	4	30	56
Total	60	25	107	192
% Total	31.3	13.0	55.7	100.0
Normalizer; EHI = 1	2.400	1	4.280	
Multiply GLO sample	91.20	21.00	329.56	441.76
Normalized (%)	20.6	4.8	74.6	100.0

Note: Only the three periods with low probability ($P \leq 0.01$) in Table 1 are included.

Prehistoric values were multiplied by 2.4 to compensate for having 2.4 times the total site percentage of early historic Indian values. This admittedly simplistic analysis suggests early historic Euro-American sites account for about 75 percent of the GLO trails, whereas early historic Indian sites account for only 5 percent and Late Prehistoric, for about 20 percent (Figure 7).

This sort of normalization makes two precarious assumptions. The first is that all sites that produce trails will be associated with the same amount of trail, regardless of time period. The second is that all sites from all time periods are represented equally in the archaeological record, that is, a Late Prehistoric site is just as likely to be found as an early historic Euro-American site. Neither of these assumptions is likely to be accurate, as discussed in the Limitations of Analysis section, and cannot be controlled for in this study.

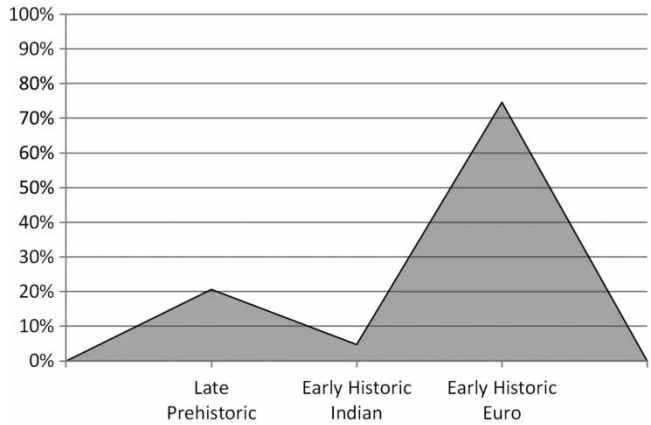

FIGURE 7 Percentage of GLO trails that can be attributed to each time period after normalization for sample size (see Table 2). Only the three periods with low probability ($P < 0.01$) are included (see Table 1).

Discussion

There is strong evidence that Late Prehistoric, early historic Indian, and early historic Euro-American sites are associated with the trail system mapped by the GLO in 1838–1861 in northern Iowa. The strongest statistical relationship is with early historic Euro-American sites ($P = .000001$), followed by early historic Indian ($P = .00037$) and Late Prehistoric ($P = .01$). Earlier time periods had poor correlation ($P > .05$). When simplistically normalized for number of sites and proximity to GLO trails, it appears that early historic Euro-American sites are associated with about three-quarters of the trail system, and Late Prehistoric and early historic Indian sites are associated the remaining quarter. However, this almost certainly underestimates the role of Indian sites. Historic Euro-American sites are easier to find because they contain copious artifacts, have far more durable artifacts, are more likely to be documented in early maps, and are less likely to be hidden by taphonomic processes than older sites are. If one makes the reasonable assumption that early Euro-Americans were utilizing an existing Indian trail system and creating sites along it, the proportion of Euro-American sites along the trail system could overwhelm the sample, obscuring the trail system's origins. It is fair to say that the GLO trails attributable to Indian sites are probably grossly underestimated, but the actual number cannot be determined in this study.

Other regions are likely to have different results. If the sample for this project had focused only on Dubuque County, which was largely settled by Euro-Americans at the time of survey, the percentage of GLO trails associated with early Euro-American sites would probably be far higher, but if it had focused only on Allamakee County in far northeast Iowa, which has comparatively more Late Prehistoric sites and GLO-mapped trails, the percentage of GLO trails associated with Late Prehistoric sites would probably be far higher. Shifting this analysis to other areas would also likely produce different results: for example, southeast Iowa was extensively settled by Euro-Americans at the time of GLO mapping; therefore, the percentage of GLO trails attributable to protohistoric and early historic Indian sites is probably far lower.

It is fair to say that the presence of GLO-mapped trails greatly increases the odds that Late Prehistoric and early historic Indian and Euro-American sites are nearby, and archaeologists surveying near these areas should be attuned to their possible presence.

This study indicates there is no increased chance of finding earlier prehistoric sites, such as Paleoindian, Archaic, or Woodland sites, near GLO trails. This is interesting in its own right, suggesting that idealized routes for trails shift over time and may not be greatly influenced by topography. While it is perhaps intuitive to believe that there are routes through the topographic landscape that are universally considered preferable, such as along ridgetops or down gradual valleys into river bottoms, this belief is not supported by these data. A better model might be that trail networks in Iowa are constantly changing as settlements move, and local topography plays a minor role in the placement of trails. As time goes on, and settlements and resources shift, the trail system evolves. The GLO maps perhaps record a snapshot of this evolving trail system, as Late Prehistoric and early historic Indian trails were becoming

less important to mid-nineteenth-century travelers, but portions of the older trail system were still in use.

Acknowledgments

Christopher J. Atkinson, Colin M. Betts, John F. Doershuk, Cynthia L. Peterson, and three anonymous reviewers provided comments and suggestions on earlier versions of this paper; their comments were greatly appreciated. This study was made possible because of the digitization, directed by Joe Alan Artz, of GLO maps and records of archaeological sites.

Notes on Contributor

Bill Whittaker is an archaeologist at the Office of the State Archaeologist at the University of Iowa. He is the editor and co-author of *Frontier Forts of Iowa* (2009 University of Iowa Press) and the forthcoming *The Archaeological Guide to Iowa* (2015 University of Iowa Press).

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