Phase III Archaeological Data Recovery

The Ritter No. 1 Site (33HY0167)
Stage 1: Geomorphological Assessment, Soil Phosphate Testing, and Microdebitage Coring
Harrison Township
Henry County, Ohio

February 2018

Prepared for:
Henry County Transportation Improvement District
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EXECUTIVE SUMMARY

In October 2017, the Henry County Transportation Improvement District (HCTID) contracted The Mannik & Smith Group, Inc. (MSG) to conduct Stage 1 activities for the Phase III archaeological data recovery of a portion of the Ritter No. 1 site (33HY0167) in Harrison Township, Henry County, Ohio. The archaeological data recovery is being conducted as a condition of a U.S. Army Corps of Engineers (USACE) permit for the construction of a new bridge spanning the Maumee River in Napoleon, Ohio, pursuant to a Memorandum of Agreement (MOA) among the USACE, Buffalo District, the Ohio Department of Transportation (ODOT), the Henry County Engineer's Office, and the Ohio State Historic Preservation Officer.

The Stage 1 activities were stipulated in the document *Data Recovery Plan for a Portion of the Ritter No 1. Site (33HY0167) for the New Maumee River Crossing Project, Harrison Township, Henry County, Ohio (ODOT PID #22984)* (Chidester 2017), which was incorporated into the MOA as an attachment. Specifically, three separate but related activities were described: a geomorphological assessment of site formation processes within the impacted portion of 33HY0167, a soil phosphate survey to identify potential prehistoric activity areas, and a microdebitage soil coring survey, also to identify potential prehistoric activity areas. The first two activities were completed by the Applied Anthropology Laboratories (AAL) at Ball State University, while the third activity was completed by MSG.

The geomorphological assessment resulted in the finding that the swales on either side of the levee that runs east-west through the project area likely act as floodchannels during high-volume flood events. This has likely resulted in differential scouring of landforms within the project area followed by slackwater deposition of sediments as floodwaters recede. This suggests that the swale areas have a higher probability of containing more deeply buried cultural deposits. Furthermore, a BtE horizon resulting from pedogenic processes was identified between the Ap and Bt horizons. It can be assumed that any features within the BtE horizon are intact.

The microdebitage survey revealed a spatial distribution of microartifacts consistent with the distribution of magnetic anomalies documented during the Phase II investigation of 33HY0167 – namely, along the western end of the levee running through the project area. However, the results of the soil phosphate survey present a negative image of the results from the magnetic gradient and microdebitage surveys. High soil phosphate values were recorded to the northwest and southeast of the magnetic anomaly cluster. This indicates that prehistoric activity was likely widespread across the Phase III project area, with the high soil phosphate zones and the magnetic anomaly cluster representing functionally distinct activity areas within the site.

Based on these results, MSG recommends that the plow zone be mechanically stripped from the entire Phase III project area at the start of data recovery excavations. Following the mapping and excavation of any potential cultural features within the BtE horizon, manual or mechanical stripping of the BtE horizon should occur in locations where (a) features within the BtE horizon are distinctly mismatched with the size, shape, and/or orientation of recorded magnetic anomalies, indicating the potential for more deeply buried features/contexts, and (b) high soil phosphate levels suggest potential areas of human activity not indicated by the magnetic gradient survey. Any cultural contexts/features identified within the Bt horizon will then be mapped and excavated.

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1.0 INTRODUCTION

In October 2017, the Henry County Transportation Improvement District (HCTID) contracted The Mannik & Smith Group, Inc. (MSG) to conduct Stage 1 activities for the Phase III archaeological data recovery of a portion of the Ritter No. 1 site (33HY0167) in Harrison Township, Henry County, Ohio (Figures 1.1-1.2). The archaeological data recovery is being conducted as a condition of a U.S. Army Corps of Engineers (USACE) permit for the construction of a new bridge spanning the Maumee River in Napoleon, Ohio, pursuant to a Memorandum of Agreement (MOA) among the USACE, Buffalo District, the Ohio Department of Transportation (ODOT), the Henry County Engineer's Office, and the Ohio State Historic Preservation Officer (OSHPO).

The Stage 1 activities were stipulated in the document *Data Recovery Plan for a Portion of the Ritter No 1. Site (33HY0167) for the New Maumee River Crossing Project, Harrison Township, Henry County, Ohio (ODOT PID #22984)* (Chidester 2017), which was incorporated into the MOA as an attachment. Specifically, three separate but related activities were described: a geomorphological assessment of site formation processes within the impacted portion of 33HY0167, a soil phosphate survey to identify potential prehistoric activity areas, and a microdebitage soil coring survey, also to identify potential prehistoric activity areas. The first two activities were completed by the Applied Anthropology Laboratories (AAL) at Ball State University, while the third activity was completed by MSG.

The purpose of this summary report is to briefly describe the results of the Stage 1 activities and to make recommendations regarding the scope of Stage 2 activities. Section 1 includes a description of the project area and a summary of the results of Phase I and II investigations for the New Maumee River Crossing (NMRC) project. Section 2 describes the research design for Phase III, Stage 1 activities. Section 3 summarizes the results of each of the Stage 1 activities, while Section 4 contains recommendations for the Phase III, Stage 2 activities – specifically, areas to be targeted for mechanical removal of the plow zone during data recovery excavations. Individual reports for each of the Stage 1 activities are contained here as appendices.

Several key personnel have contributed to this project. Dr. Robert Chidester, RPA (MSG) is the Principal Investigator for the project and the author of this summary report. Mr. Phillip Bauschard, M.S. (MSG) conducted the microdebitage soil coring survey, including fieldwork, laboratory processing and analysis. Dr. Kevin A. Nolan (AAL) conducted the soil phosphate survey, while Mr. Matthew P. Purtill, M.A. (AAL) completed the geomorphological assessment. Project Archaeologist Kate Hayfield, B.S. and GIS Specialist Bryan Agosti, M.A. (both MSG) prepared the graphics in this report. Ms. Karen Braxton was responsible for report formatting and production.

1.1 Description of the Project Area

As described in MSG's Phase II report for the NMRC project (Chidester et al. 2016), archaeological site 33HY0167 (Ritter No. 1) is located in an agricultural field on the south side of the Maumee River in Harrison Township, just outside the corporate boundaries of the City of Napoleon, Ohio. Based on the results of the Phase I and Phase II cultural resource investigations for the NMRC project conducted by MSG, the proposed construction of a new bridge across the Maumee River at this point will impact approximately 1.5 ac (0.62 ha) of 33HY0167, or approximately 21% of the total site area as currently recorded (see Figure 1.2). It is presumed that the construction of a new roadway connecting the bridge to State Route 110 will result in the complete destruction of archaeological deposits within the road right-of-way, thus severely impacting the site's potential to yield significant archaeological data. As the site exists entirely below ground, however, data recovery within the NMRC project area is considered an acceptable mitigation alternative to preservation in place.

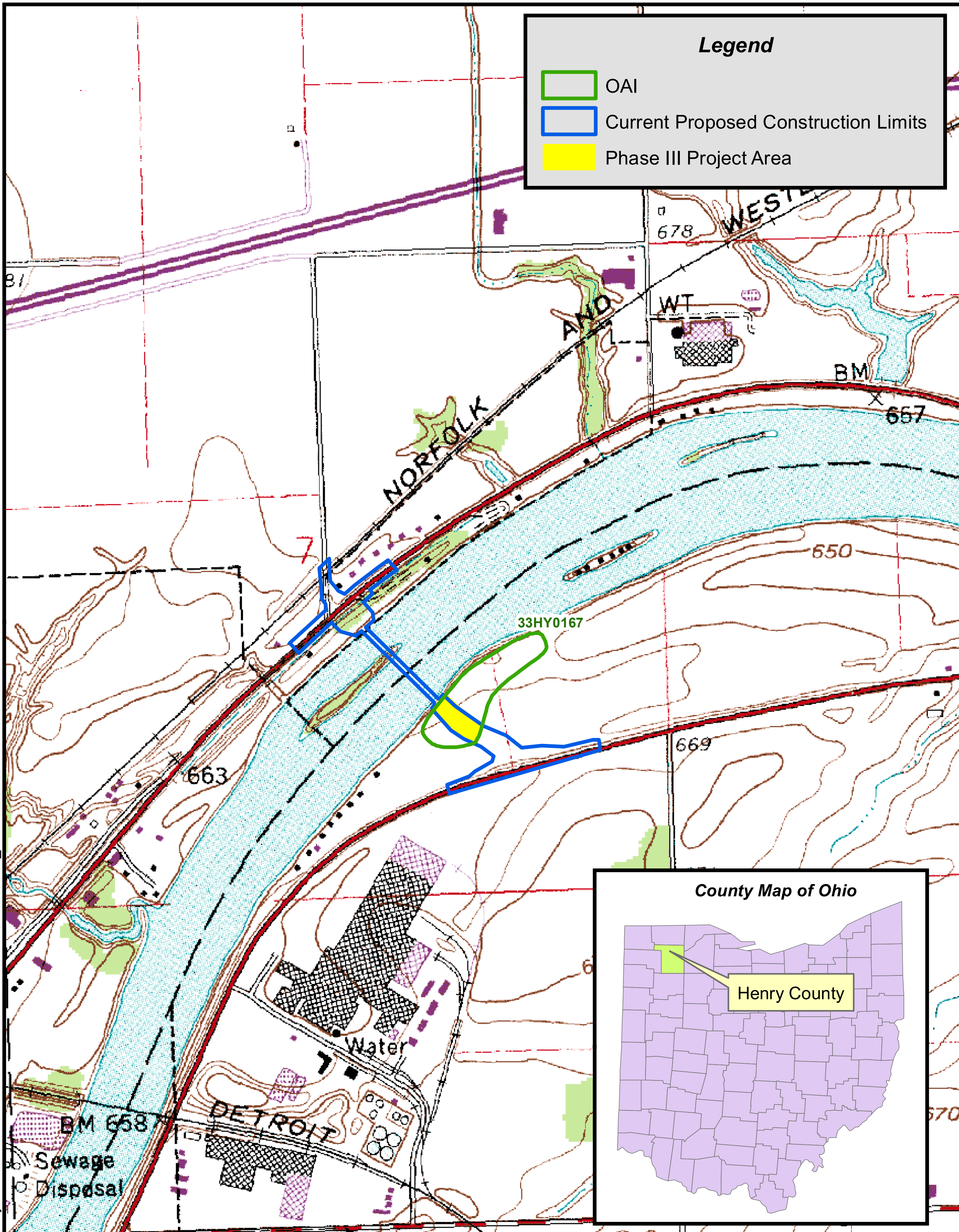

Figure 1.1
New Maumee River Crossing Project
Napoleon, Ohio

Notes
USGS Quadrangle, 7.5' Series Topographic
Napoleon East, OH 1960 Revised 1977

Feet
0 500 1,000

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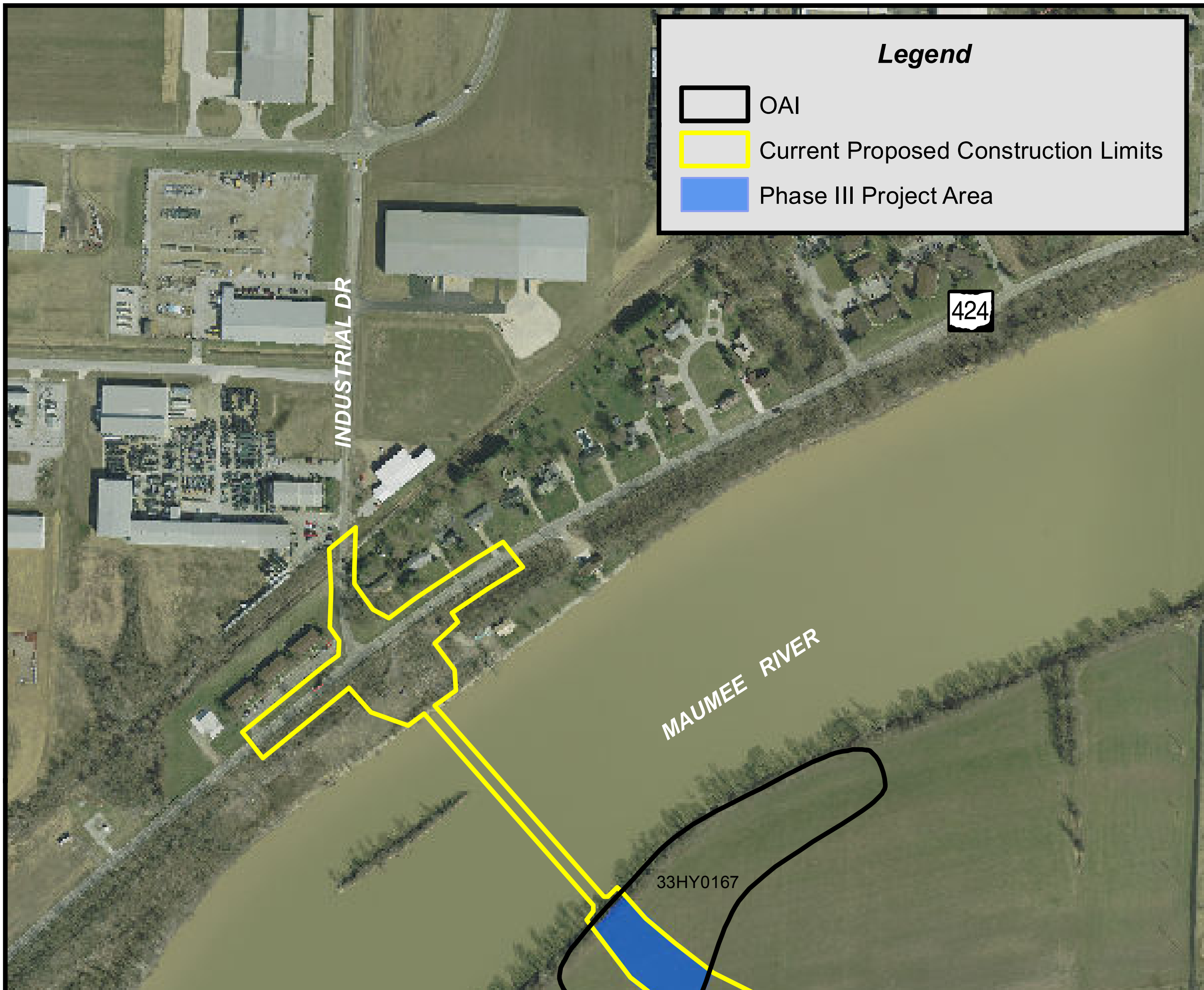

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Figure 1.2
New Maumee River Crossing Project
Napoleon, Ohio

Notes
The Henry County photography, dated April 2011, is provided by OGRIP as part of the Ohio Statewide Imagery Program.

Feet
0 250 500

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1.2 Phase I and Phase II Cultural Resource Investigations of 33HY0167

MSG conducted a Phase I survey of the New Maumee River Crossing Project Area in the Fall of 2014 (Chidester et al. 2015). This survey included two areas, one on the north side of the river and one on the south side of the river. As a result of the Phase I survey, a prehistoric artifact scatter consisting of non-diagnostic lithic debitage and fire-cracked rock (FCR) was identified within the project area in a corn field on the south side of the Maumee River. This artifact scatter was interpreted by the Principal Investigator as an extension of previously recorded archaeological site 33HY0167, the Ritter No. 1 site. Originally identified in 1981, the Ritter No. 1 site was recorded as a late Paleoindian – Early Archaic lithic scatter, possibly a workshop, located on a natural levee approximately 164 ft. (50 m) south of the river. The 2014 survey conducted by MSG, which included shovel testing and controlled surface survey, resulted in the recovery of 68 lithic artifacts (including FCR and lithic debitage from the whole spectrum of the reduction process).

In April and November 2015, MSG conducted Phase II archaeological testing of that portion of 33HY0167 that falls within the proposed construction zone for the NMRC project. MSG subcontracted OVAI to conduct a magnetic gradient survey of that portion of 33HY0167 located within the New Maumee River Crossing Project Area. OVAI identified 17 magnetic anomalies of potential archaeological interest during this survey; soil coring resulted in the reduction of the number of potentially cultural anomalies to 11. The identified anomalies appear to be clustered between the N940-N980 survey grid lines, which corresponds to the western end of a natural levee on which 33HY0167 was originally recorded in 1981. On the basis of the magnetic gradient survey and soil coring, OVAI recommended test excavations of four of the anomalies. MSG then conducted a two-stage field investigation in April 2015: a timed, controlled surface collection of 16.4-ft. (5-m) blocks throughout the site boundaries within the project area, followed by test excavations of the four magnetic anomalies suggested by OVAI. Test excavations of an additional five magnetic anomaly locations (representing a wider variety of anomaly types, including two that had been characterized by OVAI as non-cultural) were conducted in November 2015.

Only one Phase II test unit (Anomaly 1, which had been identified by OVAI as a possible pit feature or large rock) failed to yield any evidence of cultural activity. The remaining eight test units all revealed at least one cultural feature or cultural deposit. (Several additional soil stains and areas of obtrusive fill that were initially recorded as features were later determined to be likely root casts or rodent burrows.) In total, eight prehistoric features or possible living surfaces representing occupations dating to the Late Archaic, Middle Woodland, Late Woodland and Late Prehistoric periods were identified within the NMRC project area. No Paleoindian or Early Archaic components were identified.

While site-specific natural formation processes were found to have complicated the archaeological record in this location, that portion of 33HY0167 that is within the NMRC project area appeared to exhibit a high degree of physical integrity despite over 100 years of agricultural disturbance (primarily from plowing activity). While the overall surface-collected assemblage exhibited some aspects of spatial patterning that differed from subsurface cultural contexts, this patterning may represent cultural activity that did not result in the formation of sub-plow zone features or features that possess a distinctive magnetic signature. Furthermore, the majority of test units exhibited a general similarity between artifact assemblages from screened plow zone samples and assemblages from sub-plow zone feature and living surface contexts, indicating direct association. In those cases that did not exhibit such similarity, the discrepancies were explained with reference to site formation processes. Furthermore, it was demonstrated that the intact sub-plow zone cultural features and deposits within the project area have the ability to yield data that can address a wide variety of research questions relevant to the investigation of the Late Archaic, Middle Woodland, and Late Woodland/Late Prehistoric periods in northwestern Ohio. Therefore, MSG recommended that the portion of 33HY0167 that is present within the NMRC project area is eligible for the NRHP under Criterion D (information potential).

Following the Phase II investigation, the U.S. Army Corps of Engineers determined that 33HY0167 is eligible for the NRHP and initiated consultation with ODOT, the Henry County Engineer's Office, and the OSHPO, as well as tribal consultation. This consultation resulted in an MOA among the consulting parties that stipulated data recovery as mitigation for the adverse effects to 33HY0167 that will result from the construction of the new bridge and associated roadways.

2.0 RESEARCH DESIGN FOR STAGE 1 ACTIVITIES

A detailed research design for the overall Phase III data recovery efforts at the Ritter No. 1 site is contained in the *Data Recovery Plan* (Chidester 2017), and will be summarized here. Following the completion of Phase II evaluative testing at 33HY0167, enough data had been collected from the site to justify a determination of eligibility for the National Register of Historic Places (NRHP) under criterion D. Multiple temporal components spanning the Late Archaic through Terminal Late Woodland/Late Prehistoric transition period were identified within the site, and it was demonstrated that these intact sub-plow zone cultural features and deposits have the ability to yield data that can address a wide variety of research questions relevant to the investigation of the Late Archaic, Middle Woodland, and Late Woodland/Late Prehistoric periods in northwestern Ohio (Chidester et al. 2016). A total of ten research hypotheses were developed to guide the Phase III data recovery excavations of 33HY0167, covering site formation processes and archaeological methodology; patterns of lithic raw material utilization and behavioral correlates of stone tool production; social organization, settlement patterning, and trade / exchange relationships; and issues of cultural identity among northwest Ohio populations throughout the time periods represented at 33HY0167 (Chidester 2017:43-47).

However, site-specific formation processes appear to have complicated the archaeological record within the current project area. In particular, concerns about the effects of potentially high soil acidity and unusual sedimentary deposition resulted in some interpretive difficulties. In addition, the results of manual test unit excavation during the Phase II investigation did not appear to match up as well with the results of the magnetic gradient survey as was expected (Chidester et al. 2016). These concerns led to the inclusion of the following hypothesis (Hypothesis #1) in the research design for Phase III investigations of 33HY0167: *Certain types of archaeological deposits or cultural activities are characterized by lower magnetic visibility than others. In addition, site-specific environmental formation conditions can lower the magnetic visibility of features over time, or alternatively result in false positives. A site-specific understanding of these variables can therefore help to guide the interpretation of the results of magnetic gradient survey* (Chidester 2017:43).

In order to test this hypothesis, as well as to more efficiently target large-scale excavation efforts during Phase III fieldwork, the *Data Recovery Plan* recommended that three distinct activities be conducted prior to data recovery excavations. Collectively designated as "Stage 1 Activities," these included a geomorphological assessment of the site location, a soil phosphate survey, and a microdebitage soil coring survey. The purpose of the geomorphological assessment was to provide a better understanding of natural site formation processes and the impact that these have had on archaeological site formation at 33HY0167. The purpose of the soil phosphate and microdebitage surveys was to identify whether areas of prehistoric cultural activity, including potential feature locations, are located in parts of the current project area other than those that were identified by an earlier magnetic gradient survey of the project area (Burks 2015). These Stage 1 activities were intended to provide additional context regarding site formation processes at 33HY0167, and to set the stage for a full evaluation of Hypothesis #1 during Stage 2 of the data recovery investigations. (The Stage 1 activities were not intended to address Hypotheses #2-10. These hypotheses will be addressed during the Stage 2 investigations.)

3.0 RESULTS OF STAGE 1 ACTIVITIES

Field investigations for the Stage 1 activities were conducted in November 2017, following the re-establishment of the Phase II site grid. While detailed reports for each activity are contained in the appendices to this report, they will each be briefly summarized here.

3.1 Geomorphological Assessment

As described in Appendix A, the AAL completed the geomorphological assessment in November 2017. The assessment included a desktop review of relevant reference material on local bedrock geology, soils, and topographic data from both USGS quadrangle maps and LIDAR data. This portion of the assessment included not just the Ritter No. 1 site but also the locations of three other sites / site clusters along the Maumee River in the vicinity of Napoleon: the Gunn-Eberle site complex (33HY0033, 33HY0077, 33HY0081, 33HY0082, and 33HY0083), the Campbell Soup site (33HY0181-0184), and the Johnson site (33HY0207). In addition to the desktop review, a field investigation of the Ritter No. 1 site was conducted. This investigation included a walkover survey, the collection of sediment samples from three bucket auger probes, and the examination of an exposed cut bank on the river's edge. Following the field investigation, the AAL subjected 15 sediment samples representing the major soil horizons present at 33HY0167 to particle-size analysis and pH measurements.

The Ritter No. 1 site is located on a high alluvial terrace in a meander bend above the deeply incised Maumee River. The upper 1 m (3.3 ft) of sediment in this location appears to represent a mantle of Holocene overbank deposition that lies on top of an older ridge-and-swale landform. Both the bucket auger probes and the cut bank examination indicated a typical Ap/A-E-Bt-BC horizonation within the area of 33HY0167. The E horizon was noted to be relatively deep and eluvial in origin, and to transition into a BtE horizon. Given the pedogenic formation of the BtE horizon, any archaeological features located in this horizon are likely intact. However, the swales on either side of the levee within the site area have likely served as floodchannels during flood events, resulting first in a scouring of the ground surface and then slackwater deposition when flood waters recede. This differential burial and scouring of the area might explain why some older (Late Archaic) material was found on the ground surface, above later Woodland deposits as well as Late Archaic deposits in the BtE horizon. Finally, pH measurements of the sediment samples collected from the site revealed only slightly acidic to neutral to slightly alkaline soils, indicating that the lack of faunal material and the relative paucity of botanical material recovered from the site during Phase I and Phase II investigations is due to cultural formation processes rather than high soil acidity.

The desktop review revealed that the Campbell Soup site is located on the same alluvial terrace as the Ritter No. 1 site, but is 3 m (9.8 ft) lower than 33HY0167. Thus, this area likely floods more frequently. It also exhibits a deeper A horizon, indicating that it has a higher potential for buried cultural deposits than 33HY0167. Similarly, the Gunn-Eberle site complex is located on an alluvial landform in a meander bend on the north side of the Maumee River to the southwest of Napoleon. This alluvial landform also exhibits ridge-and-swale topography, and the lower portions of this landform are more likely to contain buried archaeological deposits.

The Johnson site is unique among the four sites / site complexes examined in that it is located on a high alluvial terrace above both the Maumee River and South Turkeyfoot Creek (to the east of Napoleon), approximately 11 m (36 ft) above both stream channels. Before extensive modification by Euro-American settlers, this landform exhibited dune or dune-like geomorphology and would have hosted a xeric vegetation regime, unlike the lower-lying Gunn-Eberle, Ritter No. 1 and Campbell Soup sites. The Johnson site exhibits little potential for buried archaeological deposits.

As a postscript, two projectile point fragments were identified on the ground surface during AAL's walkover survey of 33HY0167. These points were collected and their locations recorded using a hand-held GPS unit. They have been cataloged (see Appendix D) and will be integrated into the comprehensive site catalog for 33HY0167 during Stage 2 of the Phase III investigations.

3.2 Soil Phosphate Survey

As described in Appendix B, the AAL completed the field collection of soil samples from the Ritter No. 1 site in November 2017 and the laboratory processing and analysis of the samples from November 2017 – February 2018. Samples were collected on a 5-m (16.4-ft) grid using a 1-inch core tool, with separate samples being collected from the Ap and B horizons. A total of 569 samples were collected from 285 sample locations in this manner. The soil samples were then processed in the AAL's Muncie, Indiana laboratory.

The results of the soil phosphate measurements for both the Ap and B horizons were used to create interpolated surface maps (see Appendix B, Figures 4-7). These maps indicate that the majority of magnetic anomalies recorded by Burks (2015) are located in areas of low soil phosphate values. Areas of higher soil phosphate values are located to the northwest and southeast of the magnetic anomaly cluster. Magnetic anomalies 1, 7, and 12-14 are located in areas of higher soil phosphate values, with Anomaly 14 being located on the edge of one of the highest phosphate peaks. Interestingly, the areas of higher phosphate values in the northwestern and southwestern corners of the Phase III project area do somewhat correlate with small surface artifact clusters as identified during the Phase II intensive surface survey of 33HY0167. Finally, in addition to the central portion of the Phase III project area, low phosphate values were recorded along the southeastern edge of the project area in a strip less than 10 m (33 ft) wide.

As noted in the AAL report, the cultural processes that result in artifact deposition and the build-up of phosphate in the soil are not necessarily identical, and therefore we should not expect a complete overlap of high phosphate values and artifact/feature distributions. It is precisely the differences between these patterns, however, that may point towards the presence of functionally distinct areas within the site. Collectively, the data thus far generated by the magnetic gradient survey, surface inspection and subsurface excavation, and soil phosphate testing collectively indicates that prehistoric human activity was widespread across the project area.

3.3 Microdebitage Survey

As described in Appendix C, MSG conducted the microdebitage survey from November 7-9, 2017. A total of 273 soil cores were collected using a 0.75-in (1.91-cm) diameter Oakfield soil probe. Each sample was processed in MSG's laboratory facility via water-screening using nested sieves of 1/4", 1/8", and 1/16" mesh size. All cultural material was bagged by provenience and fraction and then catalogued; all non-cultural lithic material was discarded.

A total of 11 sample locations yielded one piece of microdebitage each, while another six sample locations did not yield any microdebitage but did yield other cultural data (e.g., macrodebitage, fire-cracked rock, carbon lens in the soil column). The microdebitage assemblage was dominated by Cedarville / Guelph chert (n=5) and Ten Mile Creek chert (n=3). The overall spatial distribution of both microdebitage and other cultural data collected during the soil coring correlates fairly well with the distribution of magnetic anomalies identified during the Phase II magnetic gradient survey, with over half of the positive data came from an area between N950-N985 and E960 E1000. This area corresponds to the western end of a natural levee that runs east-west between the N940 and N980 grid lines, and where a majority of the identified magnetic anomalies are located. The only other clustering evident within the overall assemblage consisted of two positive soil cores located adjacent to magnetic anomaly #1, located to the north of the area of heaviest concentration of both microdebitage and magnetic anomalies. Anomaly #1 was excavated during the Phase II investigation of 33HY0167 but did not yield any cultural material or evidence for subsurface features.

All artifacts recovered during the microdebitage survey have been cataloged and will be integrated into the comprehensive site catalog for 33HY0167 during Stage 2 of the Phase III investigations.

4.0 ANALYSIS AND RECOMMENDATIONS

This section will briefly discuss the implications of the results of Stage 1 activities for two primary research questions about 33HY0167, before providing recommendations for the scale of Stage 2 data recovery excavations.

First, the Stage 1 activities were designed to provide information about the impact that local geomorphology may have had on site formation processes at the Ritter No. 1 site (Hypothesis #1 in the Data Recovery Plan). As discussed in Section 3, the swales on either side of the levee that runs east-west through the project area likely act as floodchannels during high-volume flood events. This has likely resulted in differential scouring of landforms within the project area followed by slackwater deposition of sediments as floodwaters recede. On the one hand, this might explain certain depositional patterns observed in the cultural material within the project area – for instance, the presence of Late Archaic material both on the ground surface as well as in the BtE and Bt horizons, while Woodland-period features are present in the BtE horizon as well; or, the inability to firmly correlate the surface-collected artifact assemblage with particular temporal components of the site.

On the other hand, it also suggests that the swale areas have a higher probability of containing more deeply buried cultural deposits. Furthermore, given the pedogenic formation of the BtE horizon, it can be assumed that any features within this horizon are intact. Notably, all of the sub-plow zone contexts that have been dated to the Woodland period within the project area (Anomalies 10, 11, 14 and 16) are located within the BtE horizon. The one sub-plow zone context that was dated to the Late Archaic period (Anomaly 5) is located in the underlying Bt horizon, as are two visually and artifactually similar contexts that could not be dated (Anomalies 12 and 17) (Chidester et al. 2016).

The results of the geomorphological assessment and the observed stratigraphic patterning within the site may provide an answer as to why several of the Phase II excavation units did not reveal sub-plow zone features consistent in size and shape with the anomalies recorded during the magnetic gradient survey – there may be more deeply buried, potentially flood-disturbed Late Archaic features/contexts underlying the Woodland-period features within the project area. This is unlikely to be the case for every Woodland-period feature, of course, but it does suggest the need to excavate more deeply in these areas. In addition, in areas where magnetic anomalies or higher soil phosphate levels are indicated but where features are not obviously present at the base of the plow zone, stripping of the BtE horizon (either manually or mechanically) during data recovery excavations will be necessary.

Regarding the location of additional areas of prehistoric human activity within the project area beyond those identified by the magnetic gradient survey, the results of the microdebitage survey did not indicate additional areas of prehistoric human activity. The soil phosphate survey, on the other hand, produced results that are nearly a negative image of the magnetic gradient survey. Collectively, the results of the magnetic gradient survey, the soil phosphate survey, the Phase II intensive surface survey and the Phase II subsurface excavation indicate that prehistoric human activity was widespread across the site. In terms of Hypothesis #1 from the Data Recovery Plan (Chidester 2017), it does indeed appear that the magnetic gradient survey only revealed a portion of the cultural activity at 33HY0167, and that other methods are required to gain a full picture of this activity.

Based on the results of the Stage 1 activities, MSG recommends that the plow zone be mechanically stripped from the entire Phase III project area at the start of data recovery excavations. Following the mapping and excavation of any potential cultural features within the BtE horizon, manual or mechanical stripping of the BtE horizon should occur in locations where (a) features within the BtE horizon are distinctly mismatched with the size, shape, and/or orientation of recorded magnetic anomalies, indicating the potential for more deeply buried features/contexts, and (b) high soil phosphate levels suggest potential areas of human activity not indicated by the magnetic gradient survey. Any cultural contexts/features identified within the Bt horizon will then be mapped and excavated.

5.0 REFERENCES CITED

Burks, Jarrod

2015 *Magnetic Gradient Survey (Phase II) on a Portion of Site 33HY0167, a Prehistoric Native American Site near Napoleon, Ohio: New Maumee River Crossing Project (PID #22984).* Contract Report 2015-18, Ohio Valley Archaeology, Inc. Submitted to The Mannik & Smith Group, Inc. Copies available from The Mannik & Smith Group, Inc., Maumee, Ohio.

Chidester, Robert C.

2017 *Data Recovery Plan for a Portion of the Ritter No 1. Site (33HY0167) for the New Maumee River Crossing Project, Harrison Township, Henry County, Ohio (ODOT PID #22984).* The Mannik & Smith Group, Inc. Submitted to the Henry County Transportation Improvement District and the U.S. Army Corps of Engineers, Buffalo District. Copies available from The Mannik & Smith Group, Inc., Maumee, Ohio.

Chidester, Robert C., Phillip R. Bauschard, Kate J. Hayfield, and Bryan P. Agosti, with contributions by Jarrod Burks and Kathryn E. Parker

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Chidester, Robert C., Ryan M. Schumaker, Kate J. Hayfield, and Bryan P. Agosti

2015 *A Phase I Archaeological Survey for the New Maumee River Crossing Project (PID #22984) in the City of Napoleon (Liberty Township) and Harrison Township, Henry County, Ohio*. The Mannik & Smith Group, Inc. Submitted to the Henry County Transportation Improvement District and the Ohio Department of Transportation. Copies available from The Mannik & Smith Group, Inc., Maumee, Ohio.

APPENDIX A

GEOMORPHOLOGICAL ASSESSMENT REPORT

BALL STATE UNIVERSITY

LEARNING IN ACTION: STUDENT CENTERED RESEARCH

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APPLIED ANTHROPOLOGY LABORATORIES

Geomorphological Assessment of the Ritter No. 1 Archaeological Site, Harrison Township, Henry County, Ohio

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January 5, 2018
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1.0 Introduction and Geomorphological Methods

The geomorphological investigation was supervised by Matthew P. Purtill, MA, ABD. The objective of this geomorphological study was to classify landforms, characterize pedological processes, and identify potential site formation factors as they relate to archaeological deposits under investigation. The study included a review of several references on bedrock geology, soils, and topographic data from LiDAR and USGS 7.5 minute topographic maps.

Field investigation was restricted to the immediate vicinity of the Ritter No. 1 site, but the desktop review was expanded to include the settings of three additional sites under consideration as part of this project (Gunn-Eberlee Complex, Campbell Soup, and Johnson). Fieldwork at Ritter No. 1 included a walkover of the project area to characterize the alluvial setting and identify landform types. Three bucket auger probes were extracted to a depth of ~1 m on ridge and swale landforms. In addition, an exposed cut-bank was profiled down to ~2 m from the top of the alluvial terrace down to the modern floodplain. Fieldwork was designed to collect information to help reconstruct the stratigraphic and sedimentary environment of the site location. Sediment at each sampled location was described according to USDA-NRCS methods (Schoeneberger et al. 2012) and 15 sediment samples (10-20 g) were collected from major soil horizons and subject to particle-size analysis and pH measurement in the AASS laboratory.

A Hanna HI 9813-6 pH and conductivity meter was used to determine pH measurements for sediment samples. Measurements were taken on a saturated paste consisting of 1:1 deionized water to sediment (5 g of sediment: 5 ml of deionized water) mixture. Prior to measurement, pastes were agitated and allowed to stand for ~1 hour.

Particle-size analysis was conducted via sieve and integral suspension pressure method (Durner et al. 2017) using a Pario Meter. Upon air drying and removal of macro-organics, 10-40 g of sediment from each sample were ground in a pestle and mortar and oven dried at 65˚ C for 24 hours to remove water weight. Next, 10 ml of dispersing solution (10% sodium hexametaphosphate) and 40 ml of deionized water was added to the sample, agitated, and allowed to stand for 24 hours. The sample then was mechanically agitated and wet sieved through 0.0625 mm mesh to segregate coarse from fine fractions. Upon drying, coarse sediment was dry sieved through six nested sieve screens (φ units -1, 0, 1, 2, 3, 4) then weighed. Clay-silt fractions were determined through a series of four runs of the Pario Meter on each sample. Results of each run was averaged with obvious outliers discarded.

2.0 Geomorphological Results

A ~2.23 km long reach of the Maumee River contains the four sites under consideration (Gunn-Eberle Site Complex, Ritter No. 1, Campbell Soup, and Johnson). In this reach, the Maumee River is a meandering system that is incising into underlying dolomite-limestone and shale bedrock units (Aden et al. 2012; Venteris et al. 2009). Various back-channels and abandoned channels are apparent in topographic data. The modern river is relatively deeply incised with a narrow, discontinuous floodplain separating high alluvial terraces with a 4 to 5 m high escarpment. Terrace surfaces have varied topography, but ridge-and-swale landforms are common within concave meander bends. Geologic mapping (Aden et al. 2012; Venteris et al.

2009) indicate that channel adjacent landforms are constructed by various glacio-fluvial processes and include mixtures of clay, sand, and gravel to depths as great as 15 m.

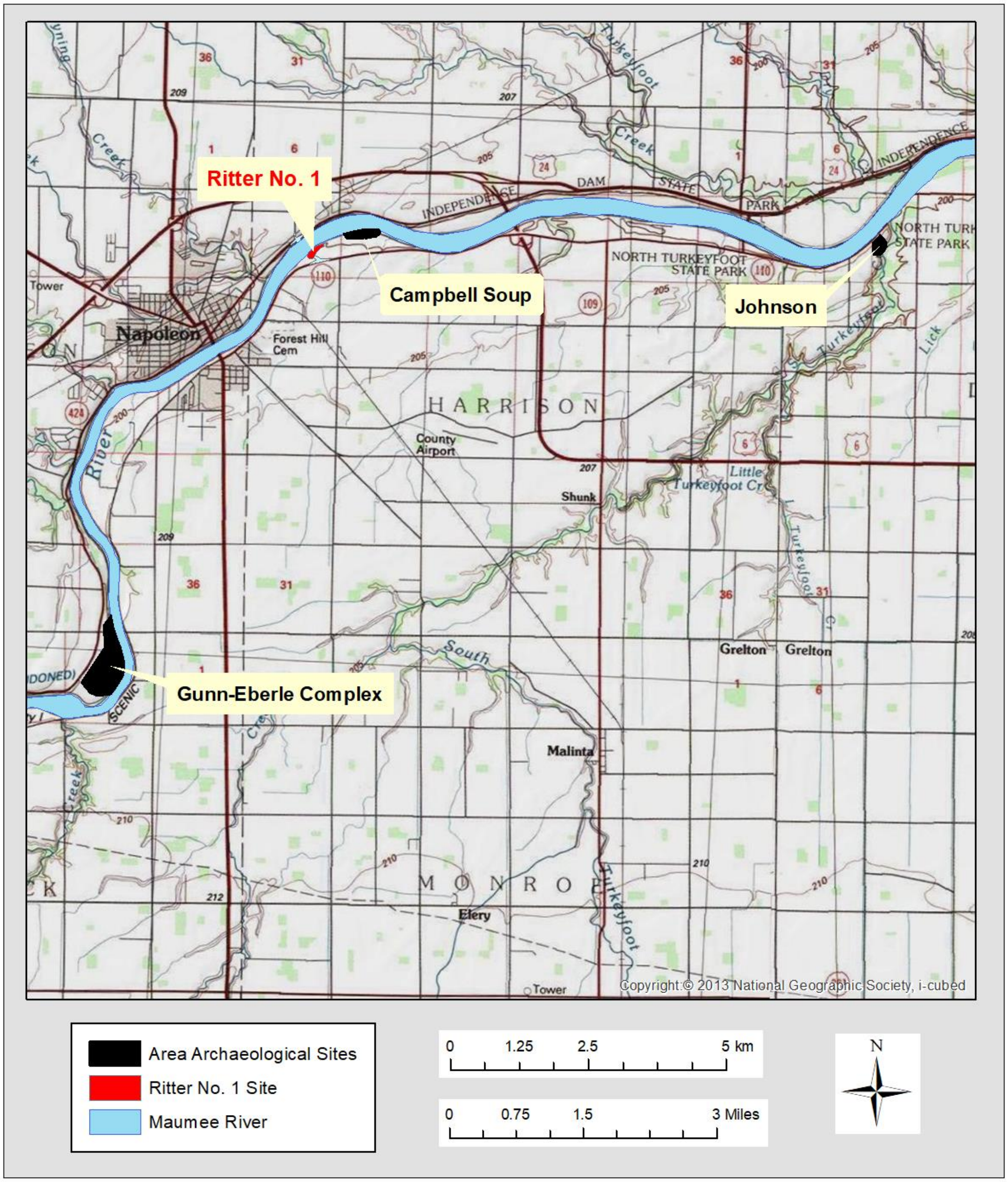

Figure 1. Location of Ritter No. 1 Site and neighboring Gunn-Eberle Complex, Campbell Soup, and Johnson sites.

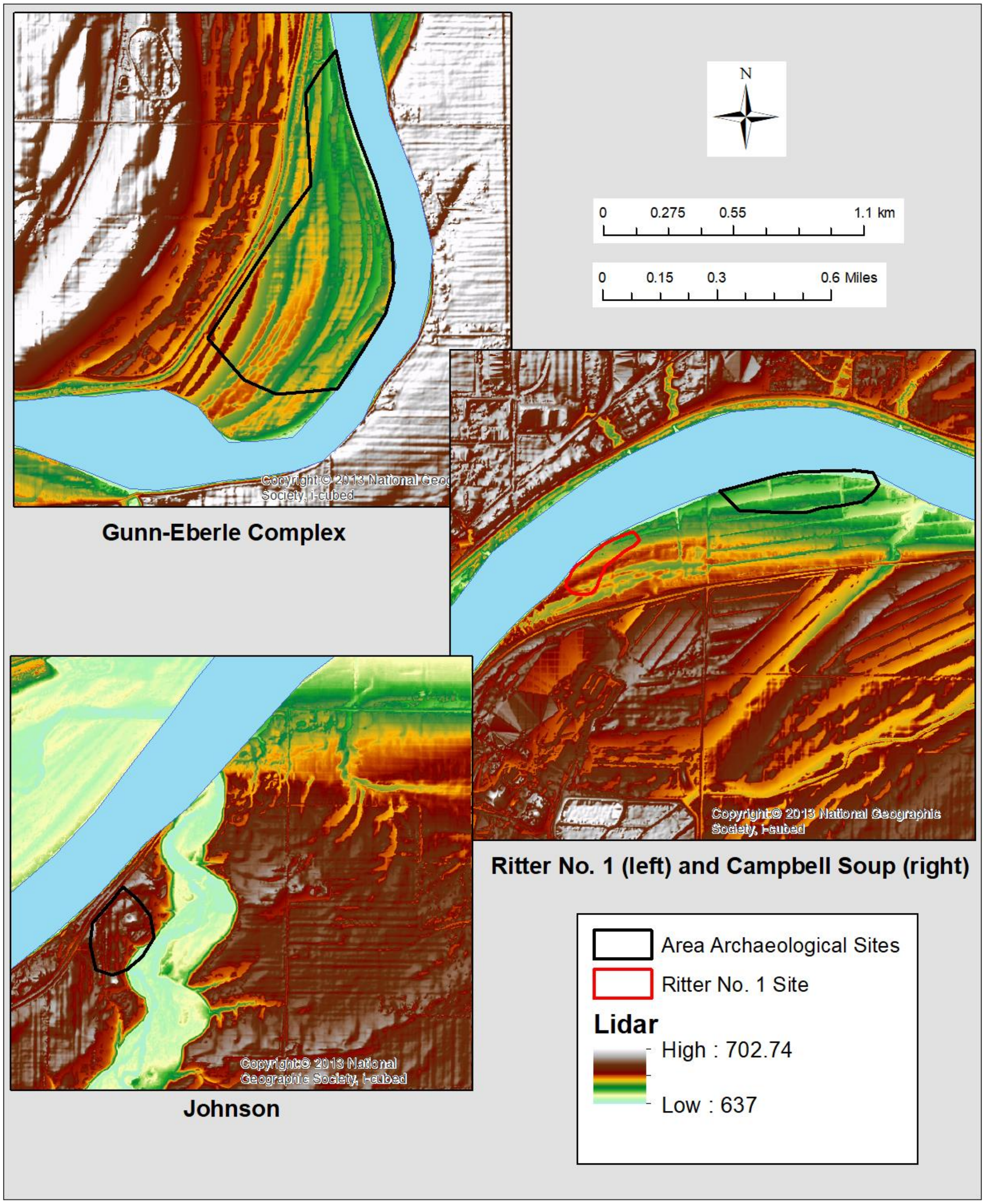

Figure 2. LiDAR data per site area

2.1 Ritter No. 1

Along the Maumee River, Ritter No. 1 is located on the convex bank of a meander bend characterized by a high alluvial terrace (T1) with ridge-and-swale topography. Based on topographic data, the meander bend is translating downriver to the east. Such topography reflects lateral migration from south to north of the Maumee River channel sometime in the past (Fryirs and Brierley 2013: 159-161). The meander bend includes a gradually sloping (<1 %) alluvial surface ranging in elevation between 199 and 202 m. In the area of the Ritter No. 1 site, soils are mapped as well developed Alfisols and Mollisols which are suggestive of a stable landform. A prominent swale is mapped as having weakly developed Inceptisols (USDA-NRCS 2017) which suggests that this feature may serve as a flood channel during high magnitude floods.

Near-surface deposits on the T1 terrace are mapped as alluvium adjacent to the Maumee River channel and as sand and gravel outwash further to the south and away from the channel (Aden et al. 2012). Although the depositional age of the terrace remains undated, the upper 1 m of sediments appear to reflect Holocene overbank deposition as evidenced by particle-size results (Table 1 and Table 2) and the recovery of Late Archaic archaeological material below the plowzone (Chidester et al. 2016). If accurate, Holocene overbank sedimentation likely mantles the underlying, and older, ridge-and-swale landform in a manner similar to that described by Henry Gray for the lower Ohio River terrace system (Gray 1984). Moreover, swale areas contain deep Ap/A horizons with high clay content in the site area (Table 1) and may have a higher potential to preserve cultural material since they tend be the location of suspended-load slackwater sedimentation following more erosive flood scouring (Fryirs and Brierley 2013:160-170).

Soil data from the three bucket augers (BA 1, 2, and 3) and cut-bank profile (cut-bank 1) indicate a general Ap/A-E-Bt-BC horizonation for the site area (Figure 3). The cut-bank section represents an exposed escarpment of the T1 alluvial terrace. The upper 2 m of this escarpment was profiled, described, and sampled. Since this section has not been plowed, it likely closely represents the original horizonation of the site prior to historic land clearance and agriculture. Significantly, the natural soil horizon shows evidence of strong eluviation that has resulted in the formation of a deep E horizon. Within plowed sections of the site, portions of intact E horizon exist beneath the Ap horizon where it gradually transitions into a Bt horizon. Sub-plowzone soils that exhibit properties of both Bt and E horizons were designated a BtE horizon here.

Soil pH long has been recognized as a potential source of poor bone/organic residue preservation in archaeological contexts (e.g., Solecki 1951; Gordon and Buikstra 1981; Nielsen-Marsh et al. 2007; Jans et al. 2002). The pH scale expresses the ratio concentration of H^+ to OH^- ions in soil solution (soil water). Typical forest soils in humid to semi-humid settings have pH values on the acidic side, usually between 3.5 and 6.0; whereas calcareous soils typically have more neutral to alkaline ranges 6.6+ (Brady and Weil 1999: 361). Soil pH can be highly variable, even over short distances. Soil pH with depth also is variable, but there is a tendency towards increased alkalinity at depths below the wetting front or normal weathering processes (Brady and Weil 1999:374). For the Ritter No. 1 Site, soil pH only measured slightly acidic to neutral to slightly alkaline (Table 3; see also Table 1).

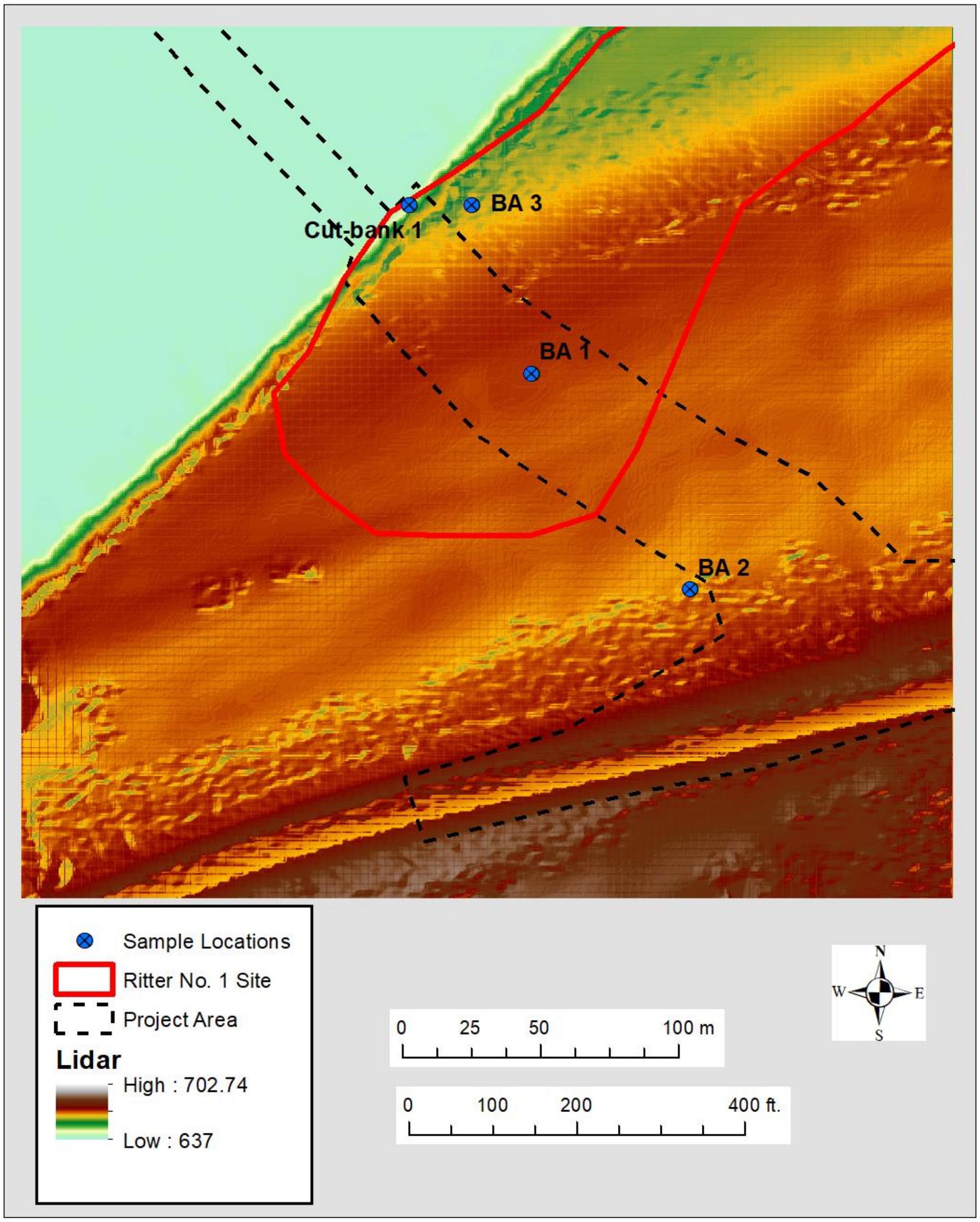

Figure 3. Location of geomorphological samples. BA = bucket auger.

Table 1. Results of field description and laboratory testing for soils from Ritter No. 1. BA = bucket auger.

BA 1		
T1, Ridge		
Haney Series soil		
Horizon	**Depth (cm)**	**Description**
Ap	0-20	moderate granular peds; friable; 10YR 4/2; pH=5.4
BtE	20-60	moderate subangular blocky peds; friable; clay/silt skins on ped surfaces; 10YR 5/4; pH=5.8
Bt1	60-80	strong subangular blocky peds; friable; clay skins on ped surfaces; Mn redox features; 7.5YR 4/4; pH=5.5
Bt2	80-100	strong subangular blocky peds; friable; clay skins on ped surfaces; Mn and Fe redox features; 7.5YR 4/4; pH=6.4
BA 2		
T1, Swale		
Hoytville Series soil		
Horizon	**Depth (cm)**	**Description**
Ap	0-20	moderate subangular blocky peds; firm; 10YR 4/1; pH=5.9
A	20-40	moderate subangular blocky peds; friable; Mn redox features; extremely firm; 10YR 4/1;
Btg	40-100	moderate subangular blocky peds; firm; rare clay skins on ped surfaces; Mn and Fe redox features; 5GY 4/1; pH = 6.9 to 7.2; gravel to cobble sized clasts encountered, perhaps outwash
BA 3		
T1, Swale		
Medway Series soil		
Horizon	**Depth (cm)**	**Description**
Ap/A	0-40	moderate granular peds; friable; 10YR 2/2; pH=6.3
BtE	40-60	moderate subangular blocky peds; friable; rare clay skins on ped surfaces; 10YR 4/4; pH=6.4
Bt1	60-80	strong subangular blocky peds; very firm; common clay skins on ped surfaces; 10YR 5/2; pH=6.4
Bt2	80-100	strong subangular blocky peds; friable; common clay skins on ped surfaces; 7.5YR 4/4; common gravel-sized clasts; pH=7.0
Cut-bank 1		
T0-T1 escarpment		
Medway Series soil		
Horizon	**Depth (cm)**	**Description**
A	0-14	moderate granular peds; very friable; 10YR 4/2; FCR noted at surface; pH=7.6
E	14-52	strong subangular blocky peds; very firm; common silt-clay skins on ped surfaces; 10YR 8/1; pH=7.6
Bt	52-125	strong subangular blocky peds; very firm; common reddish silt-clay skins on ped surfaces; 7.5YR 4/4; pH=5.8
BC	125-195	massive; compacted; 10YR 5/3; pH=5.9

Table 2. Results of particle-size analysis. BA = bucket auger.

Location	Hor.	Av. Depth (cm)	Clay	Fine silt	Middle silt	Coarse silt	Fine sand	Middle sand	Coarse sand	USDA Texture
BA 1	Ap	10	30.11%	9.75%	16.73%	13.20%	21.81%	7.90%	0.50%	Clay Loam
BA 1	BtE	30	23.25%	6.76%	15.87%	36.79%	13.14%	4.05%	0.14%	Silt Loam
BA 1	Bt1	70	32.3%	7.7%	12.0%	27.4%	17.0%	3.5%	0.2%	Clay Loam
BA 1	Bt2	90	47.10%	2.80%	6.26%	2.20%	26.16%	15.35%	0.13%	Clay
BA 2	Ap	10	36.02%	12.90%	11.25%	21.96%	8.65%	7.21%	2.02%	Silty Clay Loam
BA 2	Btg	60	44.9%	11.0%	13.6%	12.7%	9.9%	6.5%	1.4%	Clay
BA 2	Btg	100	40.8%	10.7%	12.7%	15.7%	8.7%	8.3%	3.1%	Clay
BA 3	Ap/A	30	39.9%	6.5%	8.0%	14.1%	26.1%	5.1%	0.4%	Clay Loam
BA 3	BtE	50	42.5%	8.3%	13.3%	13.0%	18.3%	4.2%	0.3%	Clay
BA 3	Bt1	70	30.9%	4.4%	16.8%	24.5%	17.4%	4.6%	1.4%	Clay Loam
BA 3	Bt2	90	33.1%	6.1%	5.5%	21.6%	29.1%	4.4%	0.2%	Clay Loam
Cutbank 1	A	10	10.1%	9.5%	17.2%	32.8%	25.4%	5.1%	0.0%	Silt Loam
Cutbank 1	E	35	27.3%	11.8%	13.4%	18.9%	25.0%	3.5%	0.0%	Clay Loam
Cutbank 1	Bt	100	10.0%	3.5%	13.1%	27.3%	39.5%	6.6%	0.1%	Loam
Cutbank 1	BC	175	13.7%	7.2%	3.3%	11.0%	46.9%	17.9%	0.0%	Sandy Loam

Clay <2.0 microns; fine silt = 2.0-6.3; middle silt = 6.3-20 microns; coarse silt = 20-63 microns; fine sand = 63-200 microns; middle sand = 200-630 microns; coarse sand = 630-2000 microns

Although it is possible that historic/modern liming may have artificially raised pH readings for this study, high pH readings at depths well below the plowzone (circa 20 cm) (Brady and Weil 1999: 374) and outside the agricultural field (Cut-bank 1), suggest that area soils naturally are moderately acidic to neutral during prehistoric times as well. This may not be entirely surprising as Haney series soils are reported to have pH values that range between moderately acidic to neutral (5.6 – 7.3) in Ap horizons to strongly acidic to neutral (5.1-7.3) in E or BE horizons to very strongly acidic to neutral (4.5 – 7.3) in Bt and BC horizons (USDA-NRCS 2017). Previous studies suggest that accelerated bone deterioration occurs primarily in moderately to extremely acidic conditions, especially pH values below 5.9 (e.g., Nielsen-Marsh et al. 2007: 1528). There is no evidence that such conditions were present at the Ritter No. 1 site and the absence of faunal remains or organic residues are likely due to other environmental or cultural conditions.

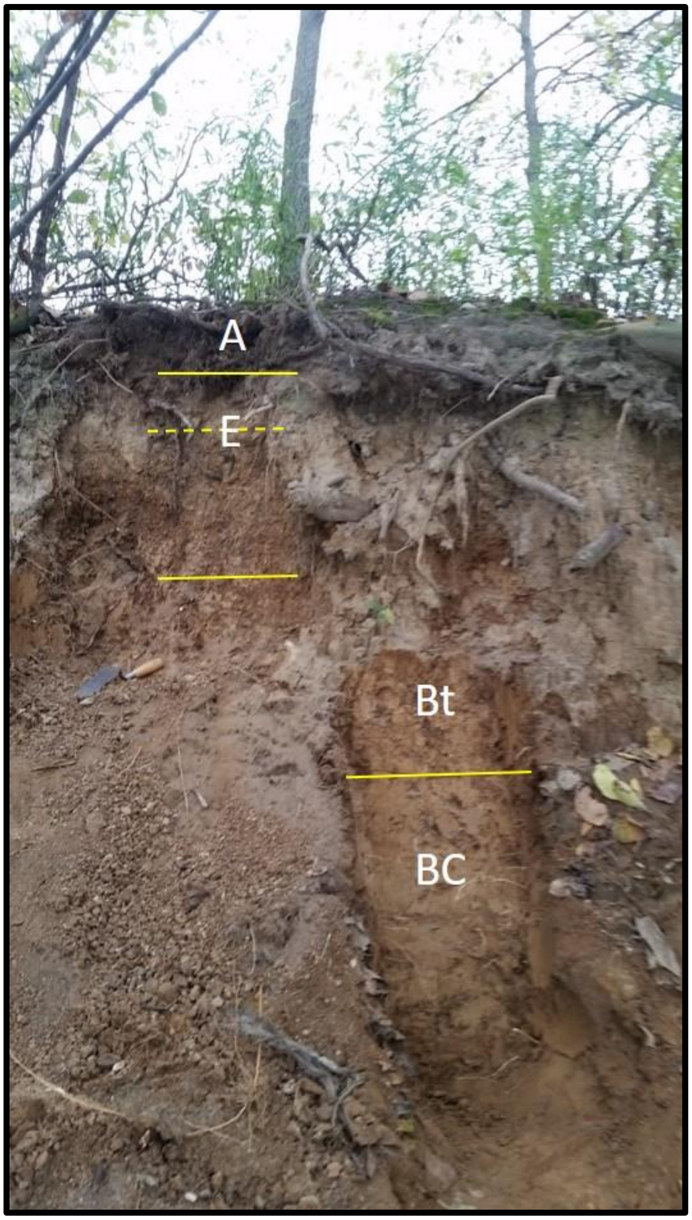

Figure 4. Profile view of Cut-bank 1 of T1 terrace.

Table 3. Average pH by Master Soil Horizon

Master Horizon	Average pH
A (A, Ap)	6.3
E	7.6
B (Bt, Btg, BtE, BC)	6.3
Total	**6.4**

2.2 Gunn-Eberle Site Complex

The Gunn-Eberle Site Complex is located across a gradually sloping (<1 %), alluvial landform characterized by ridge-and-swale topography between 200 and 203 m elevation. Such topography reflects west-to-east lateral migration of the Maumee River, likely sometime before the start of the Holocene. Landforms immediately adjacent to the current channel (<201 m elevation) are mapped as alluvium (Aden et al. 2012) and poorly developed Inceptisols and Entisols, as well as deep Mollisols (USDA-NRCS 2017). This mapping suggests frequent flooding of the lower landforms as the upper profiles undoubtedly contain Holocene-age overbank sediments. In these areas, portions of the archaeological record may be buried. At elevations above 201 m, the rolling landform is mapped as an alluvial terrace with well-developed Alfisols which suggest a stable, infrequently flooded, landform. Archaeologically, cultural deposits would be expected close to the surface at the higher elevations (>201 m).

2.3 Campbell Soup Site

The Campbell Soup Site is located immediately downriver, to the east, of the Ritter No. 1 Site on the same meander bend but approximately 3 m lower in elevation. The site predominately is located on deeply developed Mollisols, although an elevated ridge landform is mapped as containing Alfisols and is better developed. Based on soil characteristics, valley position, and lower elevation, the landform containing the Campbell Soup Site floods more frequently than Ritter No. 1. The presence of deep A horizons (Mollisols) suggests a regular flood regime where flood sediment is gradually incorporated into an upbuilding landscape (Johnson and Watson-Stegner 1987). Archaeologically, this setting may indicate a higher potential for buried material than Ritter No. 1, despite the fact that both sites occupy the same T1 terrace. This fact should be considered when comparing artifact assemblages between sites.

2.4 Johnson Site

The Johnson Site is unique among the sites discussed here as it is located on a level, high alluvial terrace overlooking South Turkeyfoot Creek to the east and the Maumee River to the north. The terrace is elevated ~11 m above both drainages and would have provided excellent vistas into both valleys. Based on the USDA soils information, a portion of this site is located on Ottokee Series soils which are mapped as Psamments (sandy Entisols) characterized by dune, or dune-like geomorphic units (USDA-NRCS 2017). Based on aerial photography, large sections of this landform has been modified and no evidence of sand dunes are observable. Prehistorically, sandy soils would have supported a xeric vegetation regime (e.g., prickly pear cactus) which makes this setting distinct from the other three sites discussed in this report. Aside from the potential for eolian sedimentation (Purtill 2017; Leigh 1998), there is little potential for deeply buried materials on such an elevated high landform.

3.0 Conclusions

The following observations are offered as a result of this study:

- Although the underlying ridge-and-swale topography likely represents a pre-Holocene lateral migration of the Maumee River, particle-size analysis and the presence of subplowzone prehistoric artifacts and features dating to the Late Archaic (Chidester et al. 2016) suggest some Holocene overbank sedimentation has occurred at the site during flood events. Importantly, flooding of this landform would have resulted in differential deposition and erosion through time. Such processes are complex and would be expected to simultaneously bury artifacts in certain settings while exposing artifacts in others. For example, swales often act as floodchannels during flood events initially scouring but later promoting slackwater deposition as flood waters recede. The fact that swales have deep A/Ap horizons (~40 cm, see BA 2 and BA 3) of high clay content, suggest continued slackwater accretion and these settings may have high potential for containing buried archaeological material. This deposition/erosion pattern may also help explain why artifacts of similar age (e.g., Late Archaic) are found both at the surface and in subplowzone contexts at the site (Chidester et al. 2016). Instead of representing asynchronous occupations, this artifact distribution pattern may be post-depositional and simply reflect differential burial and scouring of the landscape. This assessment may also help explain why older material (e.g., Paleoindian, Early Archaic) was reportedly found at the surface but later material (e.g., Late Archaic) has been identified in subplowzone contexts.

- During Phase II, it was suggested that the lack of faunal remains and limited organic debris from site contexts may be the result of acidic pH levels known to occur in Haney soil series (Chidester et al. 2016:100-102). As demonstrated here, however, soil pH levels are only slightly acidic to neutral to slightly alkaline. This result suggests that high soil acidity likely did not negatively impact faunal or organic preservation. Although it is possible that modern liming/fertilization may have artificially raised pH levels from prehistoric levels, such activity typically only impacts the pH of soils within the upper ~20 cm of profiles. It seems unlikely that liming/fertilization has seriously altered soil pH levels for all of the samples studied here, especially samples collected from the cut-bank profile away from agricultural activity.

- During Phase I and II, Chidester et al., report confusion over site stratigraphy especially the potential presence of an E, or BE, horizon (Chidester et al. 2016:102). Bucket augering and investigation of a cut-bank confirmed that the natural soil profile contained an E horizon that transitions into a Bt, or BtE, horizon. It appears that portions of this BtE are preserved beneath the plowzone across the site. It is important to remember that any artifacts/features identified within such horizons are likely intact as eluviation is a post-depositional, pedogenic, process.

- The four sites under consideration (Ritter No. 1, Gunn-Eberle Complex, Campbell Soup, and Johnson) all are situated on slightly different geomorphic settings and would be expected to have slightly variable burial and site preservation potential. Site function also may have varied at each location given the slightly different environmental settings and availability of resources. Ritter No. 1, Campbell Soup, and Gunn-Eberle Complex all are located on a T1 terrace tread with prominent ridge-and-swale topography. Low-elevation areas on these terraces appear to be flooded on a regular basis whereas elevated landforms are more stable and only flood infrequently. Archaeological and sedimentological evidence from Ritter No. 1 suggests that Holocene-age overbank sediments mantle portions of the underlying, older, ridge-and-swale topography. Such sedimentation has been occurring since at least the Late Archaic based on archaeological evidence. Significantly, flooding likely has both buried, and eroded, previously deposited archaeological materials at Ritter No. 1 and elsewhere. Of these three, Campbell Soup has the highest potential for flooding and site burial. In contrast, the Johnson Site is located on a high, level terrace that reportedly was characterized by sandy soils/dunes that may have supported a unique xeric vegetation regime. This site is located in a favorable location to exploit resources associated both with the Maumee River and South Turkeyfoot Creek. Although the high elevation suggests that Late Pleistocene or Holocene alluvial sedimentation would be minimal, the presence of Psamment soils suggest the potential for eolian sedimentation and thus site burial as well.

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APPENDIX B
SOIL PHOSPHATE SURVEY REPORT

BALL STATE UNIVERSITY

LEARNING IN ACTION: STUDENT CENTERED RESEARCH

LEARN. WORK. DISCOVER.

APPLIED ANTHROPOLOGY LABORATORIES

Geochemical Assessment of the Ritter No. 1 Archaeological Site, Harrison Township, Henry County, Ohio

Prepared for:

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Archaeology Team Leader
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February 15, 2018

AAL Project #17SP008

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Introduction

At the request of Dr. Robert Chidester, the Applied Anthropology Laboratories conducted a soil phosphate analysis of the Ritter No. 1 site (33-Hy-167) along the Maumee River (Figure 1). The field survey was directed by Mr. Matthew Purtill (see Purtill 2018), and laboratory analysis was directed by Dr. Kevin C. Nolan. The purpose of the survey was to identify potential prehistoric activity areas within the site and project area (Figure 2). This report provides a summary of the results of the survey.

Methods

Introduction

The survey was conducted using procedures established by Nolan (2010, 2014; Roos and Nolan 2012; Nolan and Redmond 2015; Swihart and Nolan 2013, 2014) and updated for this project.

Field Methods

In the field, transects were established around stakes set by Mannik & Smith with pacing between. Within each transect, samples were collected every 5 m and samples were labeled consecutively within their transects (Figure 3). Two samples were taken at each location, one each from the Ap and B horizons. Samples were collected by teams of two or three. At each sample point, one person recorded the location of the sample and the sample name with a Trimble GeoXT (2800 or 6000 series) GPS. Another team member labels the sample bag with project, site, and provenience information. The third team member extracted the soil sample using a 1-inch core tool.

Laboratory Methods

Soil phosphate saw early application in Ohio (Solecki 1951); however, it has seen limited use as the applications of geochemistry in archaeology have grown in number and sophistication over the last half century (e.g., Costa et al. 2013; Crowther 1997, 2002; Dietz 1957; Eidt 1973, 1977; Entwistle et al. 1997, 2000; Holliday and Gartner 2007; Linderholm 2007; Marwick 2005; Middleton 2004; Nolan 2010, 2014; Nolan and Redmond 2015; Roos and Nolan 2012; Salisbury 2012a, 2012b; Sandor et al. 1990; Terry et al. 2000; Wells et al. 2000; Wilson et al. 2008; Woods 1977). Following previous studies, we focus on the fine fraction and using a weak acid digestion (see Terry et al. 2000; Roos and Nolan 2012; Wells et al. 2000). For this project, Mehlich 3 (Mehlich 1984) was substituted for Mehlich 2, but otherwise the procedure of Roos and Nolan (2012) was followed.

The methods for phosphate analysis are based on Roos and Nolan (2012; see also Nolan 2010; Nolan and Redmond 2015). Phosphate testing used the molybdate colorimetric method to measure the phosphate that can be extracted by a 10% Mehlich-3 solution. The soil samples were ground in a mortar and pestle and sieved through a 125µ geological sieve and exactly 2.00 grams were collected. The soil sample was placed in 10 mL of a 10% Mehlich-3 solution, shaken for 10 minutes at > 150 rpm with a LW Scientific DSR-2100D Digital Rotator, then filtered through #391 filter paper. The extracted solution was diluted to 10% with DI water and a molybdate reagent (PhosVer3) was added and this solution was measured in a HACH Pocket Colorimeter II. The concentration of phosphate was converted to mg/kg, adjusted for dissolution, and recalculated based on its atomic weight.

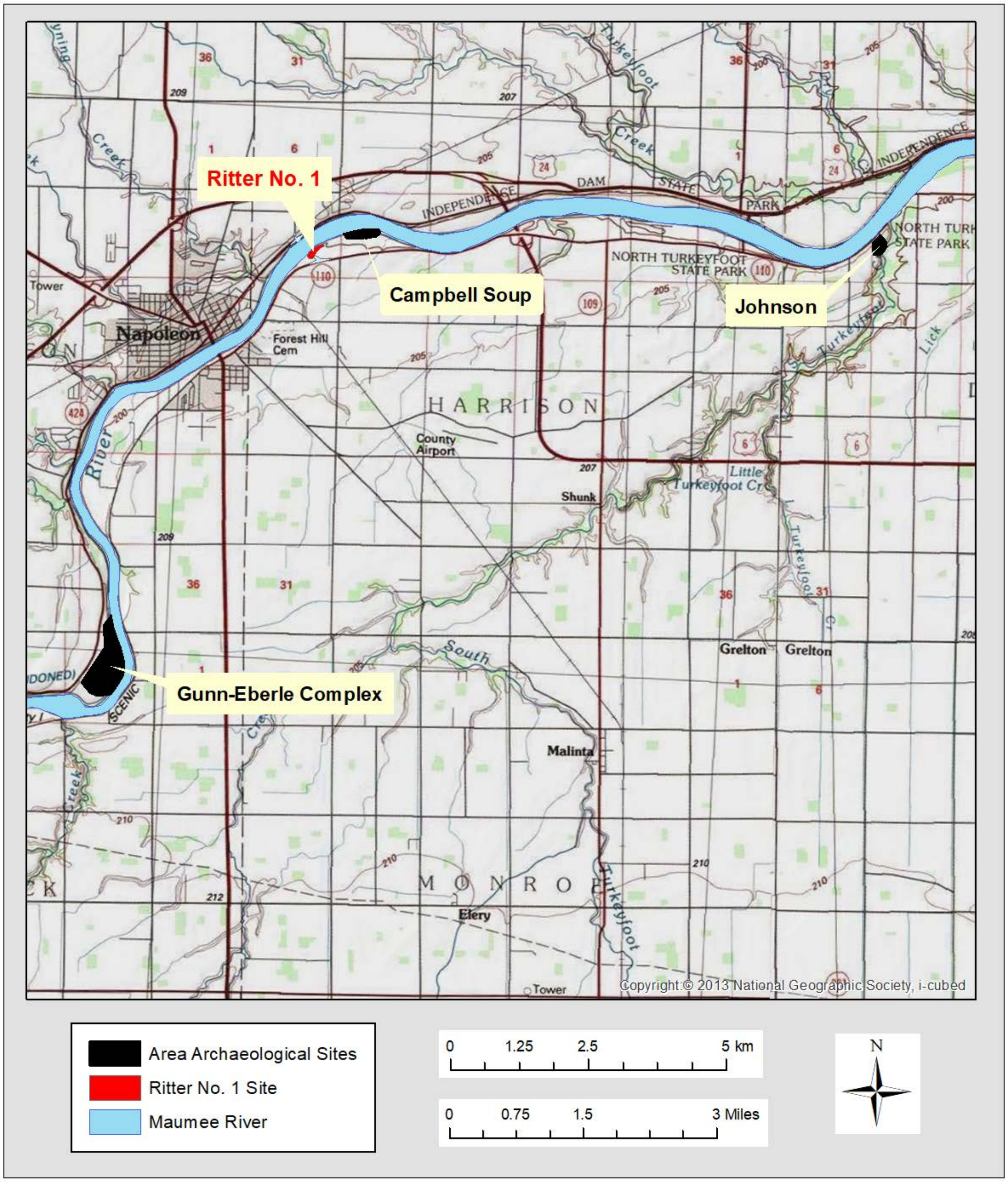

Figure 1. Location of Ritter No. 1 Site and neighboring Gunn-Eberle Complex, Campbell Soup, and Johnson sites.

Figure 2: Project Area and Anomalies from Gradiometry survey by Burks (Chidester et al. 2016).

Figure 3: Soil Sample Locations

Results

A total of 569 samples were measured for PO_4 with an average of 13.014 mg/kg (± 16.616) of phosphate per sample. Values range from 0 to > 106.765. A handful of samples exceeded measurement range of the colorimeter; however given the small number, it was decided a re-measurement at a1% dilution was not needed to meet project goals. The Ap horizon samples (N = 283) averaged 18.45 mg/kg (± 19.041) phosphate per sample, ranging from 1.63 to > 106.276 mg/kg. The B horizon samples (N = 285) averaged 7.491 mg/kg (± 11.359) phosphate per sample, ranging from 0 to > 106.765 mg/kg.

Figure 4 and Figure 5 show the sample values and the interpolated surface for the Ap and B horizons, respectively. Higher values are concentrated to the southwest and northeast ends. Figure 6 and Figure 7 show the respective surfaces with the locations of Burks' gradiometry anomalies (Chidester et al. 2016). The anomalies concentrate in the areas of lower PO_4. Interestingly, anomaly 12 is on the edge of an Ap phosphate peak, but was judged by Burks to be of probable natural origin. Surface artifacts Chidester et al. (2016:Figure 4.1) are concentrated in the northwest, central, and southwest. Some of the artifact clusters overlap with the northwestern elevated PO_4 area and the southwestern PO_4 peak. The latter peak is the highest and largest peak.

Conclusion

The lack of overlap between phosphate and artifacts has been used in the past to argue against the usefulness of the method. Those studies (Skinner 1982, 1986) had several differences from the current study (see Nolan et al. 2014:11). In particular, Skinner expected her P results to be completely redundant with the artifact distributions. This should not necessarily be the case. Soil P and artifact deposits can be generated by different processes. Artifacts can also be moved by prehistoric inhabitants and modern agricultural processes (Beck 2007; Dunnell and Simek 1995; Lewarch and O'Brien 1981; Navazo and Diez 2008; Odell and Cowan 1987; see discussion in Roos and Nolan 2012:23-24). Expecting P and artifacts to be redundant misses the advantages of using multiple methods. If geochemistry can only reinforce or duplicate tactile and traditional methods, then it is not useful or efficient.

Thus, the distribution of anthropogenic PO_4 combined with the gradiometry and artifacts gives us a complete picture of activity distribution on the landscape (Figure 8). Activities related to organic deposition that may or may not correspond to activities that yielded visible artifacts during a single pass surface survey. At Ritter No. 1, we see activities creating subsurface features not correlated with activities depositing organic residue and decay products into the soil column. We also see an artifact distribution not perfectly correlated with subsurface features. Thus we have the possibility of functionally distinct areas within the site, each detectable by different data generation techniques.

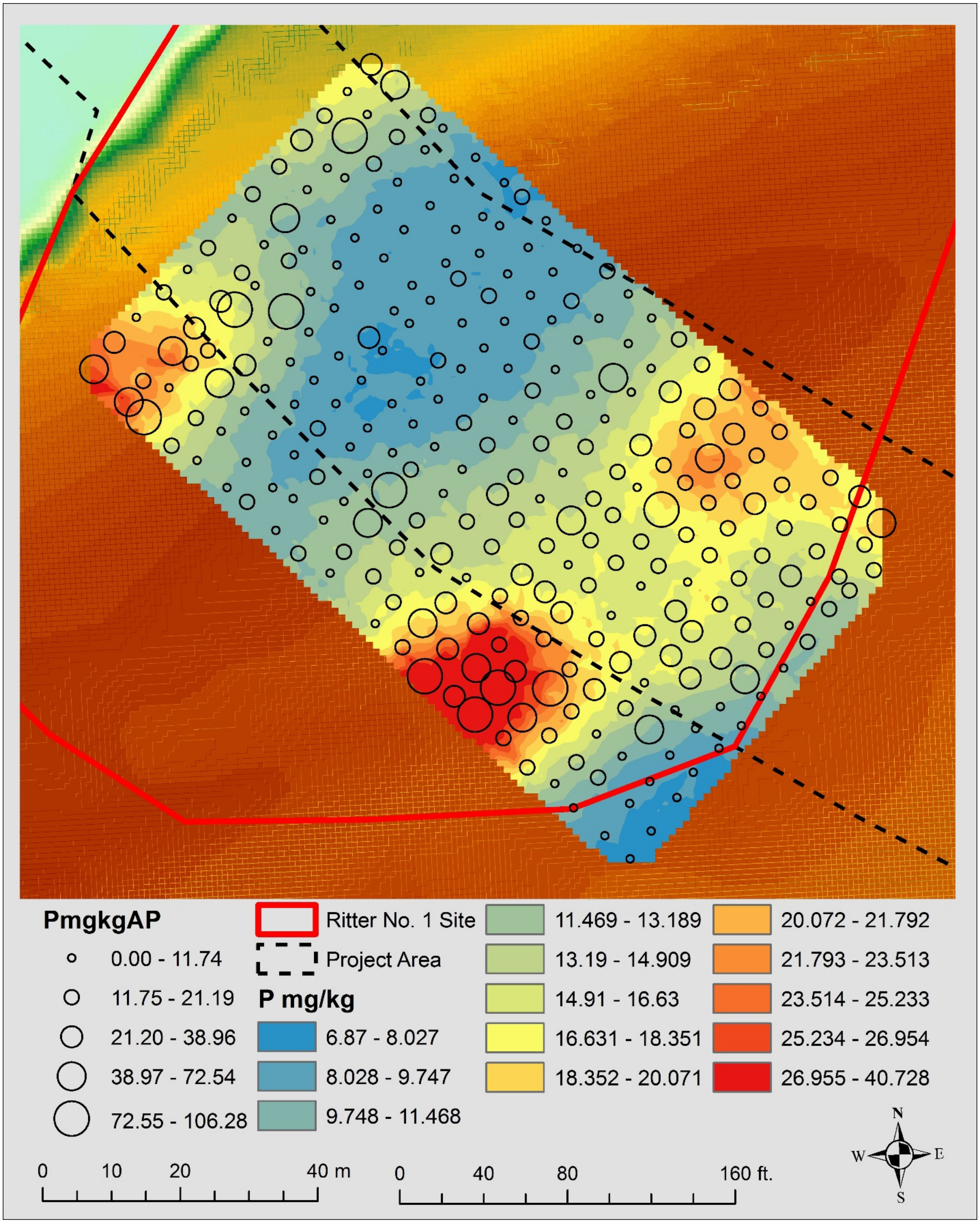

Figure 4: Ap Horizon Kriging Surface with Individual Sample Results.

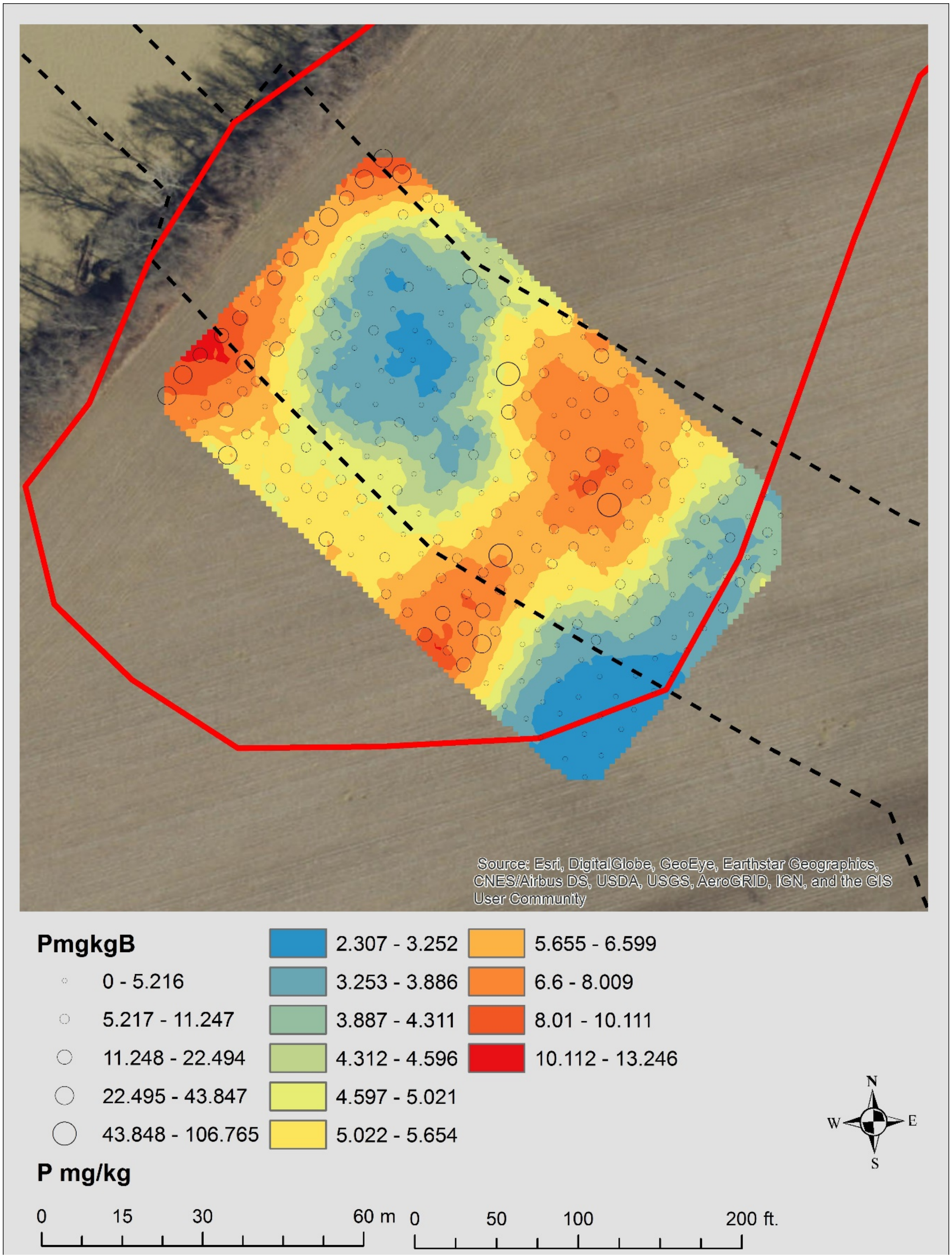

Figure 5: B Horizon Kriging Surface with Individual Sample Results.

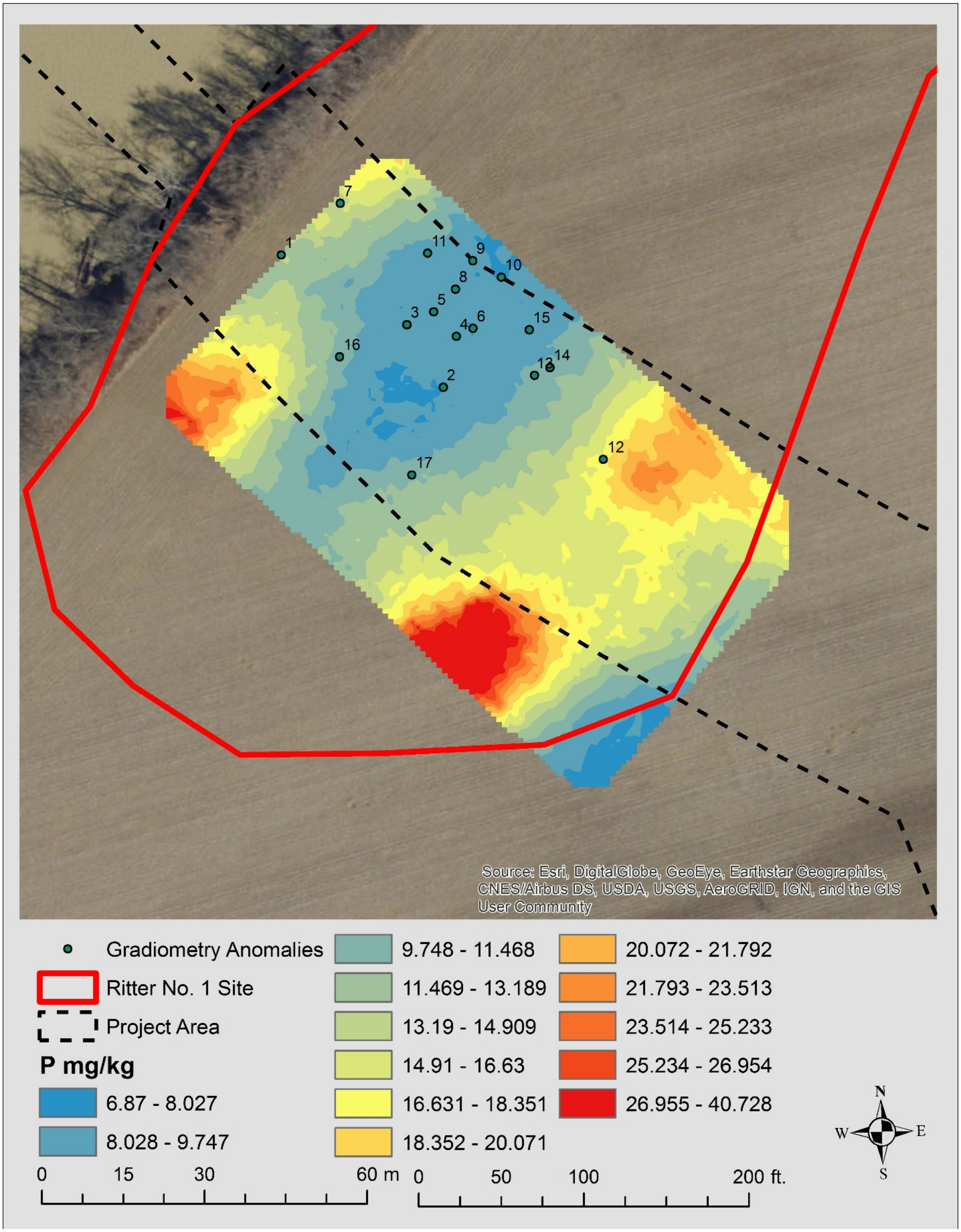

Figure 6: Ap Horizon Phosphate surface with Gradiometry Anomalies.

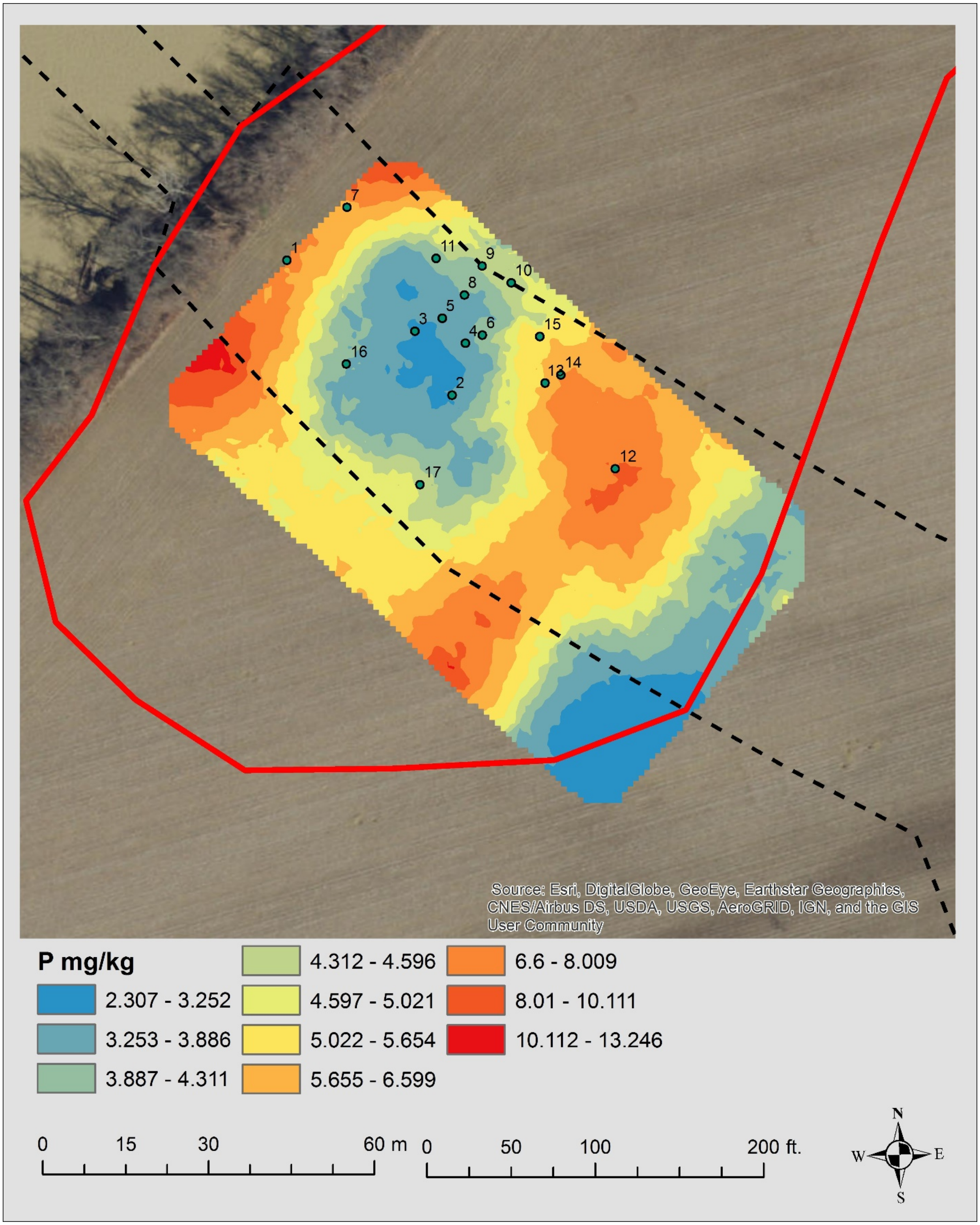

Figure 7: B Horizon Phosphate surface with Gradiometry Anomalies.

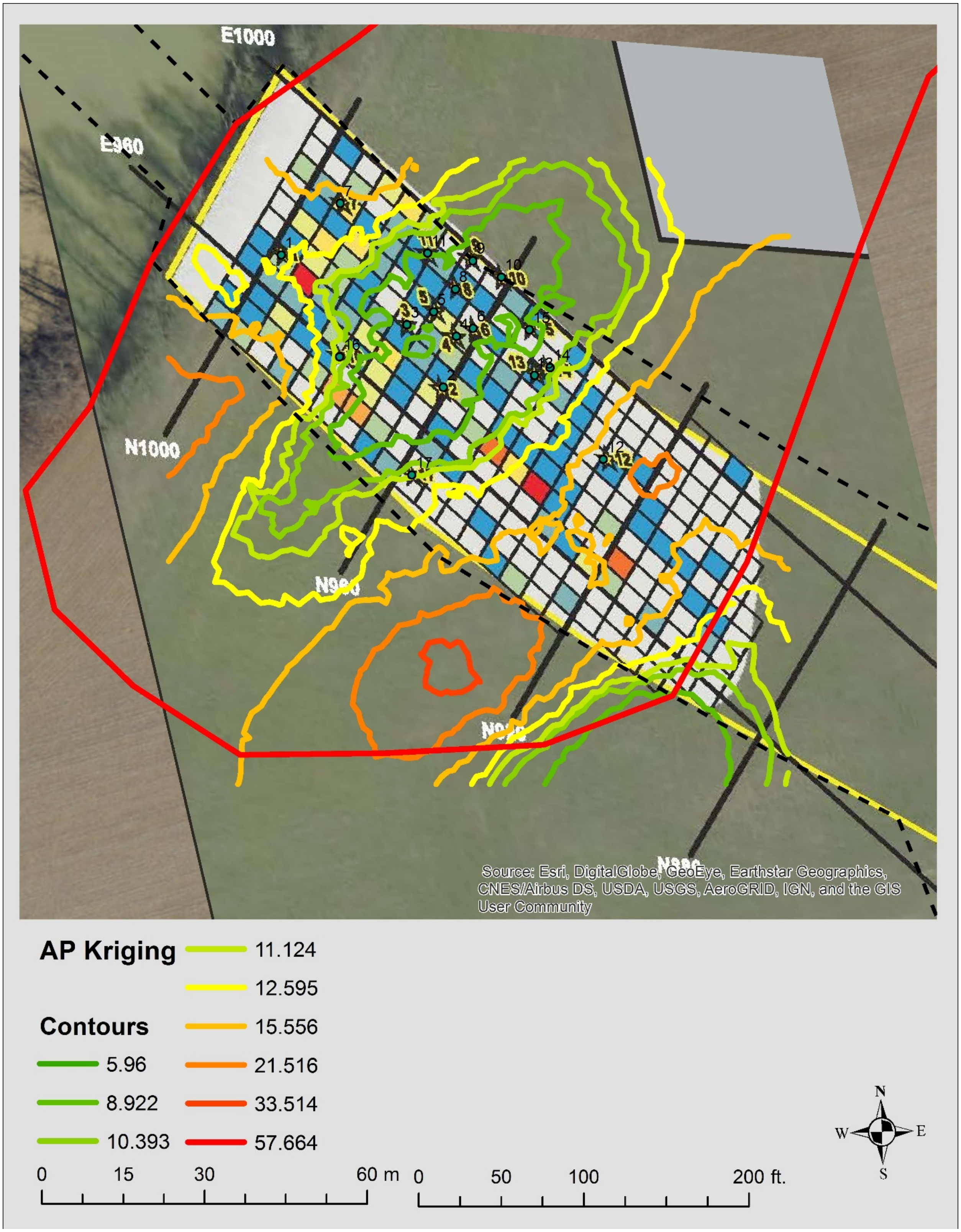

Figure 8: Chidester et al. (2016) Figure 4.1 with Ap PO_4 contours.

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APPENDIX C

MICRODEBITAGE SURVEY REPORT

February 14, 2018

Mr. Timothy Schumm
Henry County Transportation Improvement District
660 N. Perry Street
Napoleon, Ohio 43545

Re: Phase III Archaeological Data Recovery of 33HY0167: Results of Microdebitage Soil Coring Survey

Dear Mr. Schumm:

In October 2017, the Henry County Transportation Improvement District (HCTID) contracted The Mannik & Smith Group, Inc. (MSG) to conduct Stage 1 activities for the Phase III archaeological data recovery of a portion of the Ritter No. 1 site (33HY0167) in Harrison Township, Henry County, Ohio (Figures 1-2). The archaeological data recovery is being conducted as a condition of a U.S. Army Corps of Engineers (USACE) permit for the construction of a new bridge spanning the Maumee River in Napoleon, Ohio, pursuant to a Memorandum of Agreement (MOA) among the USACE, Buffalo District, the Ohio Department of Transportation (ODOT), the Henry County Engineer's Office, and the Ohio State Historic Preservation Officer.

The Stage 1 activities were stipulated in the document *Data Recovery Plan for a Portion of the Ritter No 1. Site (33HY0167) for the New Maumee River Crossing Project, Harrison Township, Henry County, Ohio (ODOT PID #22984)* (Chidester 2017), which was incorporated into the MOA as an attachment. Specifically, three separate but related activities were described: a geomorphological assessment of site formation processes within the impacted portion of 33HK0167, a soil phosphate survey to identify potential prehistoric activity areas, and a microdebitage soil coring survey, also to identify potential prehistoric activity areas. This letter describes the survey methods and results of the microdebitage soil coring survey.

Dr. Robert Chidester, RPA, MSG's Archaeology Team Leader, is the Principal Investigator for the Phase III archaeological data recovery investigations of 33HY0167. Dr. Chidester is the primary author of this letter report, and is responsible for the interpretations contained herein. Project Archaeologist Phillip Bauschard, M.S., conducted the microdebitage soil coring survey, laboratory processing, and lithic analysis, and assisted in the preparation of this report.

FIELD AND LABORATORY METHODS FOR THE MICRODEBITAGE SOIL CORING SURVEY

Soil coring for microdebitage recovery was conducted from November 7-9, 2017, utilizing the site grid that had previously been established during Phase II investigations of 33HY0167. Soil cores were taken at 16.4-ft (5-m) intervals across the site. The core locations were placed along 13 parallel transects (labeled A through M) oriented north-south, each transect having 21 sample locations. A total of 273 soil cores were collected in this manner. Coring was conducted with a 0.75-in (1.91-cm) diameter Oakfield soil probe. At each core location, the probe was inserted to approximately 11.8 in (30 cm) below ground surface (bgs). The resulting soil sample was then bagged, labeled by sample grid ID and site coordinates, and brought back to the archaeological laboratory at MSG's Maumee, Ohio office for processing. Extensive notes were kept regarding the volume of soil collected from each sample, stratigraphic layers present in the sample, inclusions (e.g., charcoal lenses, gravel, etc.), and reasons for terminating some cores prior to the target depth of 11.8 in (30 cm) bgs.

In the lab, soil samples were first soaked in tap water overnight. Each sample was then individually water-screened using nested sieves of 1/4”, 1/8”, and 1/16” mesh size. All lithic material from each fraction was collected, dried, and then examined under a desk halo-light magnifier to identify any microdebitage present in each sample fraction. When identified, microdebitage was bagged by provenience and fraction and then catalogued. All non-cultural lithic material was discarded.

RESULTS

The results of the soil coring for microdebitage recovery are presented graphically in Figure 3; tabulated data is presented in Table 1. While the goal of this particular Stage 1 activity was to identify any clusters of microdebitage with the project area that might represent prehistoric activity areas, additional data relevant to Phase III data recovery efforts was also recovered from some sample locations and will be discussed separately.

Microdebitage

A total of 11 sample locations yielded microdebitage, as shown in Figure 3 and detailed in Table 1. None of these locations yielded more than one piece of microdebitage. Seven sample locations yielded flakes between 1/8” and 1/4” in size, while four locations yielded flakes between 1/16” and 1/8” in size. The distribution of these size grades is shown on Figure 4, along with their relation to magnetic anomalies that were identified during the magnetic gradient survey (Burks 2015) and the test units that were excavated during Phase II investigations of the site (Chidester et al. 2016).

The most common type of chert material represented within the microdebitage assemblage is Cedarville/Guelph chert, which outcrops in Logan County, Ohio (to the south of the current project area). Five pieces of microdebitage made of this material were recovered, along with three microdebitage flakes made of Ten Mile Creek chert (which outcrops in Lucas County, Ohio to the northeast), two microdebitage flakes of unidentified chert, and one microdebitage flake of Flint Ridge Moss Agate chert (which outcrops in Licking and Muskingum counties, Ohio to the southeast). No patterning by size grade is apparent within these raw tool stone material categories.

Other Cultural Data

Additional cultural data was recovered from six soil core locations that did not yield any microdebitage. These included:

- Two soil cores that yielded fragments of fire-cracked rock (FCR) greater than 1/4" in size during wet-screening;
- One soil core that yielded a utilized flake greater than 1/4" in size and made of Cedarville/Guelph chert during wet-screening;
- One soil core location where a fragment of FCR greater than 1/4" in size was recovered from the ground surface prior to coring;
- One soil core location where a flake greater than 1/4" in size and made of Cedarville/Guelph chert was recovered from the ground surface prior to coring; and
- One soil core that exhibited a distinct charcoal lens from approximately 9.8-11.0 in (25-28 cm) bgs.

Figure 5 depicts the spatial distribution of this additional data in relation to the soil cores that yielded microdebitage, as well as magnetic anomalies that were identified during the magnetic gradient survey (Burks 2015) and the test units that were excavated during Phase II investigations of the site (Chidester et al. 2016). Notably, the soil core that exhibited a charcoal lens was located approximately 13 ft (4 m) south and 13 ft (4 m) east of Burks's magnetic anomaly #15, which he identified as a non-cultural anomaly based on negative evidence from a soil probe placed in the center of this anomaly (Burks 2015:17).

DISCUSSION

As can be seen in Figure 3, the overall spatial distribution of both microdebitage and other cultural data collected during the soil coring correlates fairly well with the distribution of magnetic anomalies identified during the Phase II magnetic gradient survey. The vast majority of positive data from the current soil coring was located at or north of the N950 grid line (n=15, 88%), and over half of the positive data came from an area between N950-N985 and E960 E1000. This area corresponds to the western end of a natural levee that runs east-west between the N940 and N980 grid lines, and where a majority of the identified magnetic anomalies are located. When limited to just those soil cores that yielded microdebitage, the pattern remains the same.

Furthermore, those locations of positive data outside of this area of higher concentration do not exhibit any clustering or close spatial correlation to identified magnetic anomalies, except for two positive soil cores within 16.4 ft (5 m) of magnetic anomaly #1 at the northern end of the site. One of these soil cores yielded a piece of microdebitage made of Flint Ridge Moss Agate chert, while the other yielded four small pieces of sandstone FCR. Interestingly, this magnetic anomaly was investigated through the excavation of a 6.6 x 6.6 ft (2 m x 2 m) test unit during the Phase II investigations, but did not yield any artifacts or evidence of a subsurface cultural feature in this location. The data from the current soil coring indicates that additional investigations in this location may be warranted – or, alternately, that a cultural feature was once located here but has been destroyed by plowing.

Overall, the results of the soil coring for microdebitage recovery reinforce the results of the Phase II magnetic gradient survey. No new potential prehistoric activity areas have been identified, and with the exception of the area around magnetic anomaly #12, the southern half of the site (south of the N950 grid line) lacks evidence for substantial prehistoric activity.

Sincerely,

Dr. Robert Chidester, RPA
Principal Investigator

Mr. Phillip Bauschard, M.S.
Project Archaeologist

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ATTACHMENT A

FIGURES

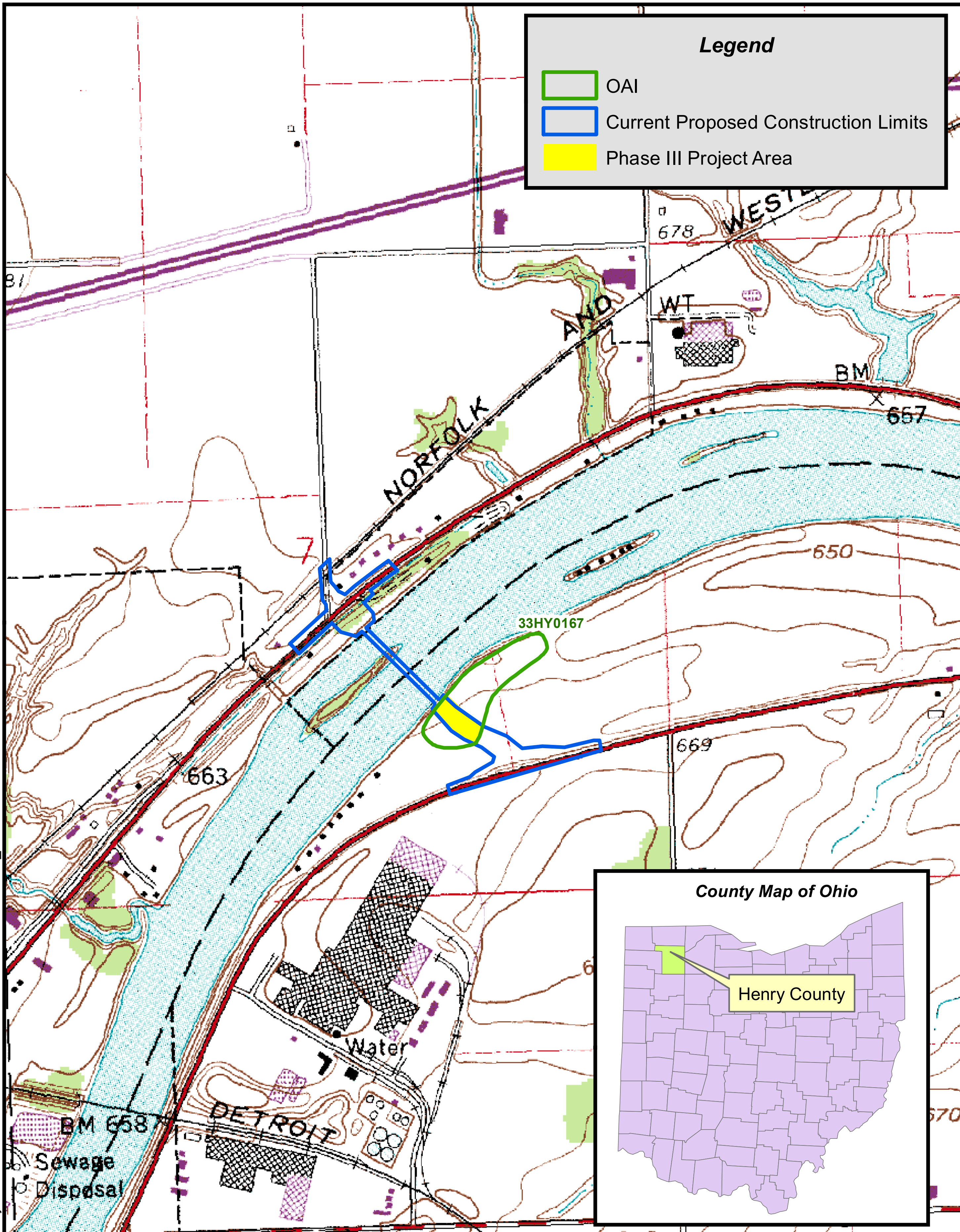

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Figure 1
New Maumee River Crossing Project
Napoleon, Ohio

Notes
USGS Quadrangle, 7.5' Series Topographic
Napoleon East, OH 1960 Revised 1977

0 500 1,000 Feet

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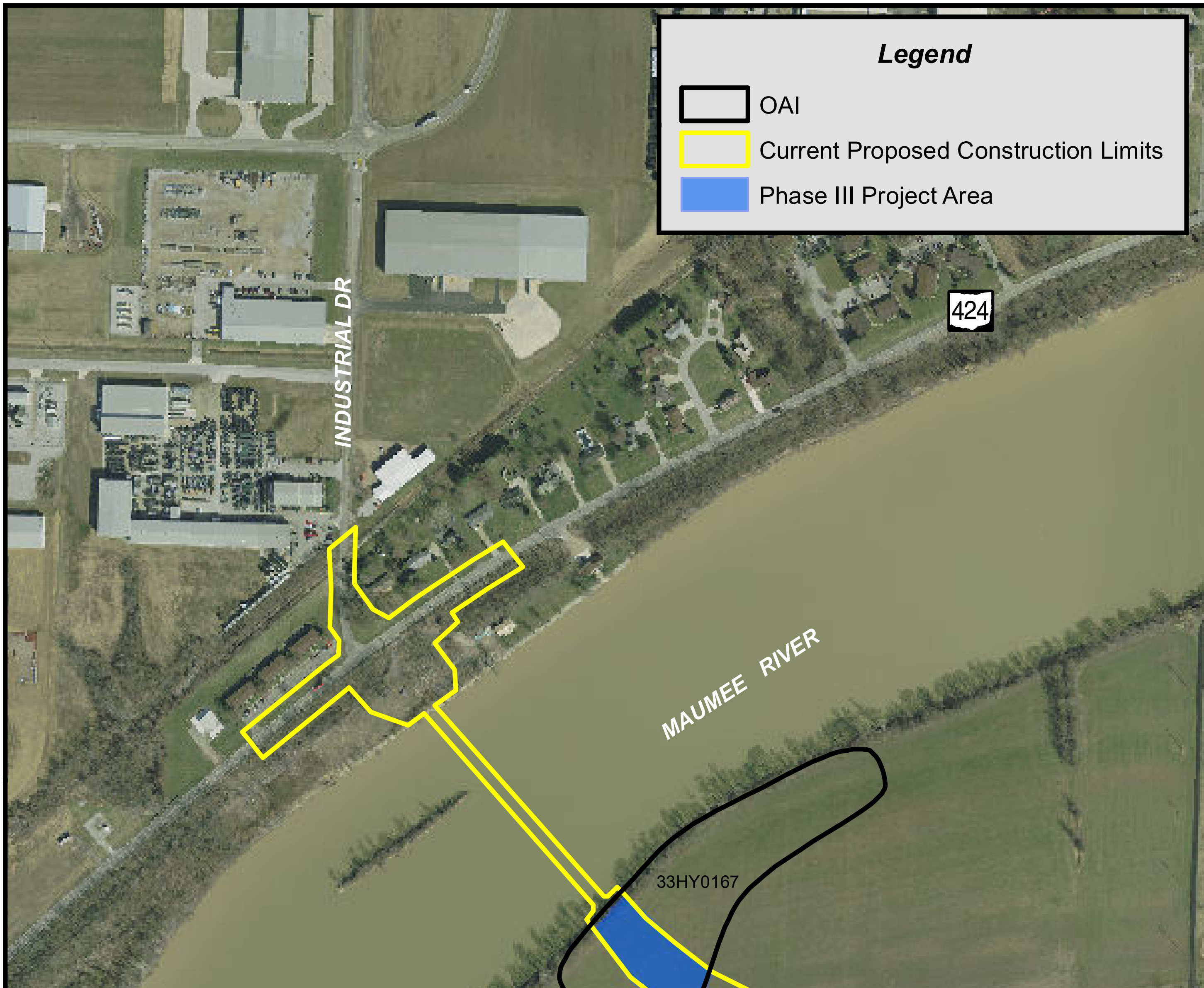

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Figure 2
New Maumee River Crossing Project
Napoleon, Ohio

Notes
The Henry County photography, dated April 2011, is provided by OGRIP as part of the Ohio Statewide Imagery Program.

Feet
0 250 500

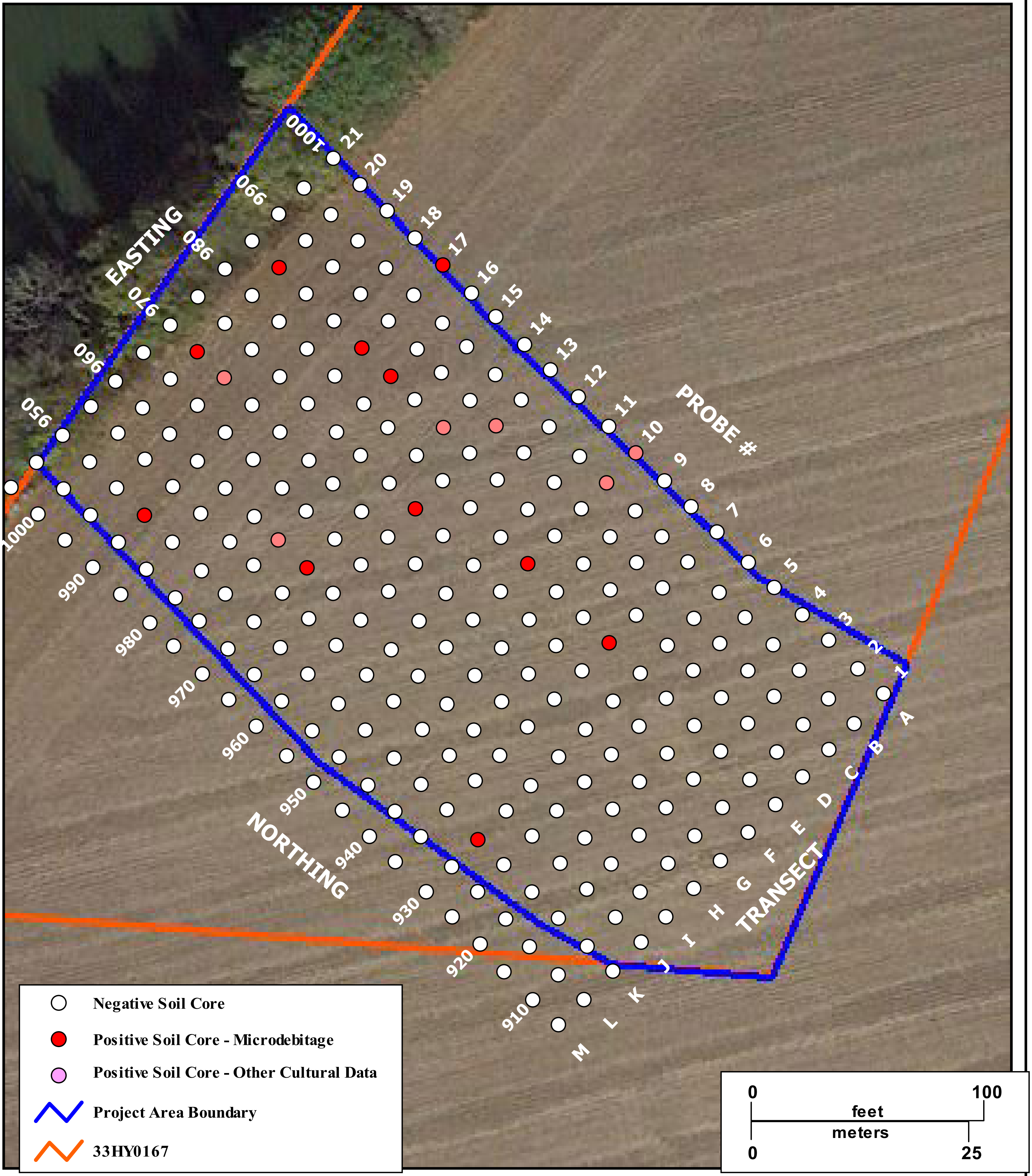

Figure 3
Microdebitage Survey Results
33HY0167
Napoleon, Ohio

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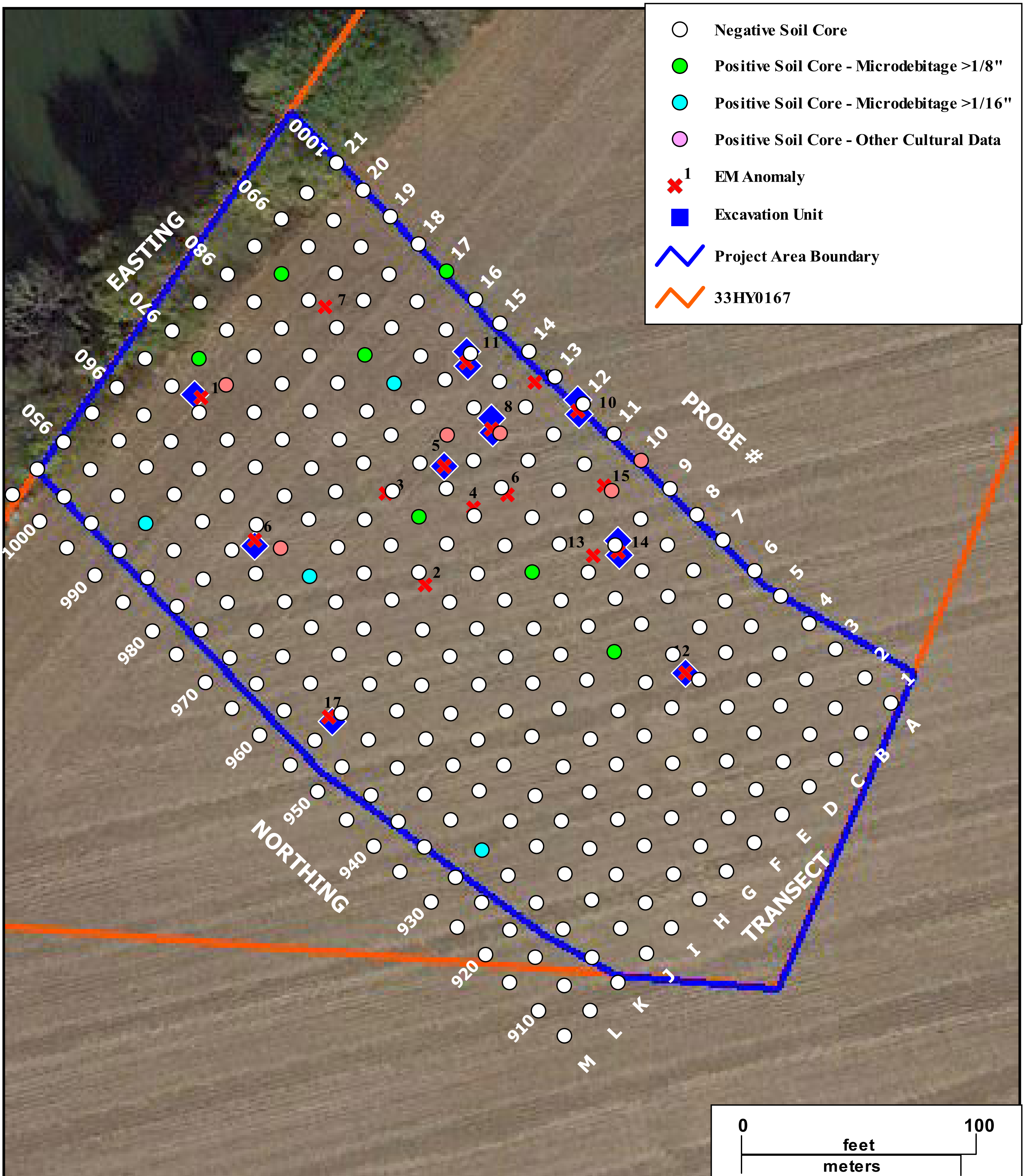

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Figure 4
Microdebitage Size Grade Distribution
33HY0167
Napoleon, Ohio

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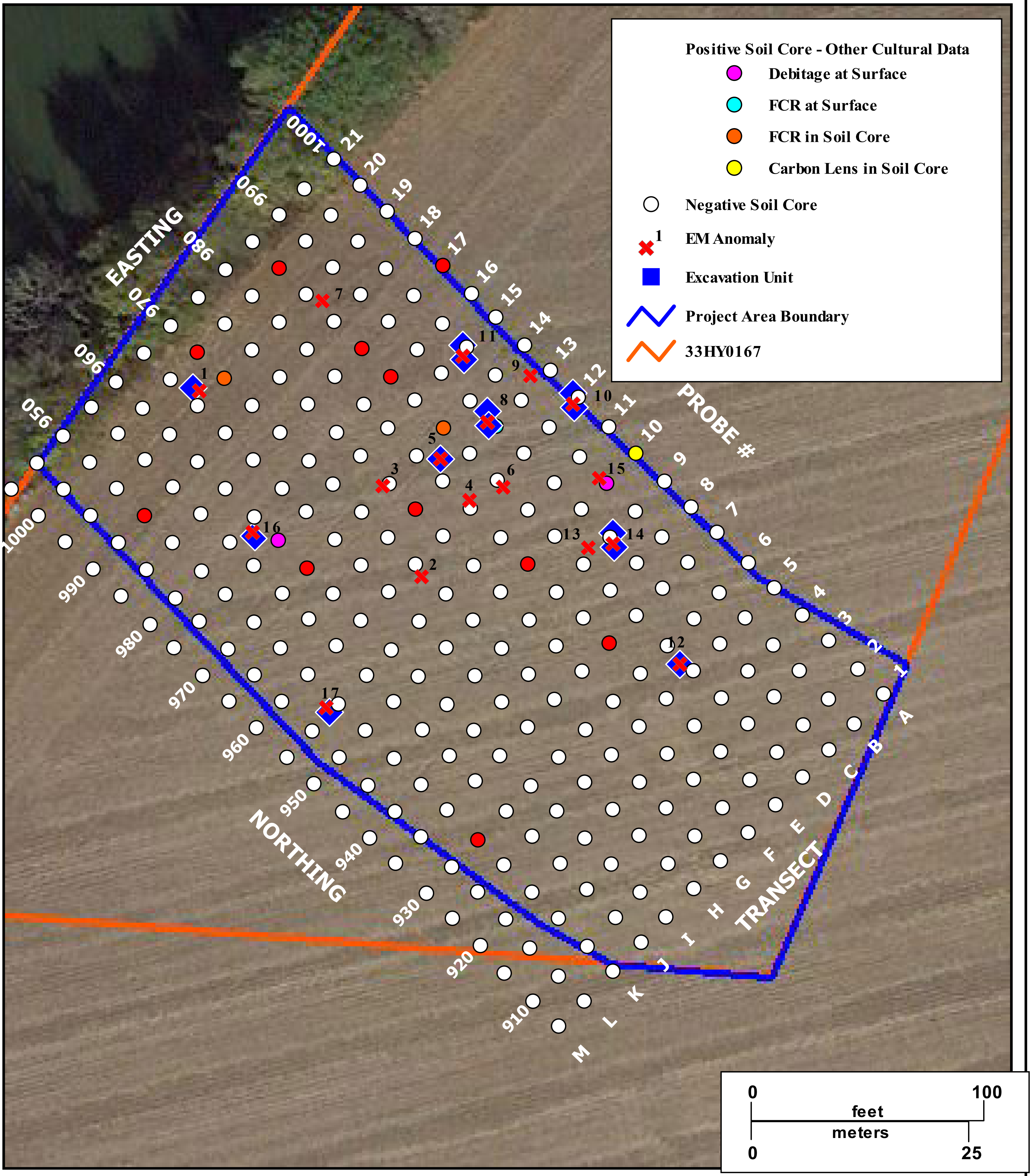

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Figure 5
Distribution of Other Cultural Data
33HY0167
Napoleon, Ohio

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ATTACHMENT B
TABLES

Table 1
Microdebitage Coring Results*

3/4-inch Diameter Core ID	Coring Date	Water Screen Date	Northing	Easting	Soil Recovery (cm)	Nature of Rejection	Retained Soil Volume (cm3)	Soil Horizons Observed	>1/4" Debitage Count	>1/8" Debitage Count	>1/16" Debitage Count	>1/4" Debitage Net Weight (g)	>1/8" Debitage Net Weight (g)	>1/16" Debitage Net Weight (g)	FCR >1/4"	FCR >1/8"	FCR >1/16"	FCR Net Weight (g)	Notes
A01	11/7/2017	11/27-12/1/17	N905	E1000	8	Loss	23	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A02	11/7/2017	11/27-12/1/17	N910	E1000	8	Stone	23	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A03	11/7/2017	11/27-12/1/17	N915	E1000	6	Stone	17	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A04	11/7/2017	11/27-12/1/17	N920	E1000	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A05	11/9/2017	11/27-12/1/17	N925	E1000	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
A06	11/9/2017	11/27-12/1/17	N930	E1000	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
A07	11/9/2017	11/27-12/1/17	N935	E1000	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A08	11/9/2017	11/27-12/1/17	N940	E1000	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
A09	11/9/2017	11/27-12/1/17	N945	E1000	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
A10	11/9/2017	11/27-12/1/17	N950	E1000	30	N/A	86	3	0	0	0	0	0	0	0	0	0	0	Carbon lens approx. 25-28 cmbgs.
A11	11/9/2017	11/27-12/1/17	N955	E1000	29	Loss	83	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
A12	11/9/2017	11/27-12/1/17	N960	E1000	28	Loss	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A13	11/9/2017	11/27-12/1/17	N965	E1000	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
A14	11/9/2017	11/27-12/1/17	N970	E1000	20	Stone	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A15	11/9/2017	11/27-12/1/17	N975	E1000	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A16	11/9/2017	11/27-12/1/17	N980	E1000	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A17	11/9/2017	11/27-12/1/17	N985	E1000	30	N/A	86	2	0	1	0	0	0.04	0	0	0	0	0	Heat-treated Cedarville/Guelph chert.
A18	11/9/2017	11/27-12/1/17	N990	E1000	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
A19	11/9/2017	11/27-12/1/17	N995	E1000	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A20	11/9/2017	11/27-12/1/17	N1000	E1000	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
A21	11/9/2017	11/27-12/1/17	N1005	E1000	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B01	11/7/2017	11/27-12/1/17	N905	E995	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B02	11/7/2017	11/27-12/1/17	N910	E995	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B03	11/7/2017	11/27-12/1/17	N915	E995	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B04	11/7/2017	11/27-12/1/17	N920	E995	15	Loss	43	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B05	11/7/2017	11/27-12/1/17	N925	E995	28	Loss	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B06	11/7/2017	11/27-12/1/17	N930	E995	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B07	11/7/2017	11/27-12/1/17	N935	E995	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B08	11/7/2017	11/27-12/1/17	N940	E995	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B09	11/7/2017	11/27-12/1/17	N945	E995	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
B10	11/7/2017	11/27-12/1/17	N950	E995	30	N/A	86	2	1	0	0	4.5	0	0	0	0	0	0	Cedarville/Guelph chert flake at surface.
B11	11/7/2017	11/27-12/1/17	N955	E995	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B12	11/7/2017	11/27-12/1/17	N960	E995	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B13	11/7/2017	11/27-12/1/17	N965	E995	15	Loss	43	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B14	11/7/2017	11/27-12/1/17	N970	E995	20	Loss	57	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
B15	11/7/2017	11/27-12/1/17	N975	E995	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B16	11/7/2017	11/27-12/1/17	N980	E995	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
B17	11/7/2017	11/27-12/1/17	N985	E995	25	Loss	72	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
B18	11/7/2017	11/27-12/1/17	N990	E995	28	Loss	80	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
B19	11/7/2017	11/27-12/1/17	N995	E995	23	Stone	66	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B20	11/7/2017	11/27-12/1/17	N1000	E995	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
B21	11/7/2017	11/27-12/1/17	N1005	E995	18	Loss	52	1	0	0	0	0	0	0	0	0	0	0	No cultural material.

*Yellow-highlighted samples were positive for microartifacts
*Blue-highlighted samples were positive for artifacts at ground surface or other cultural information

Table 1
Microdebitage Coring Results*

3/4-inch Diameter Core ID	Coring Date	Water Screen Date	Northing	Easting	Soil Recovery (cm)	Nature of Rejection	Retained Soil Volume (cm3)	Soil Horizons Observed	>1/4" Debitage Count	>1/8" Debitage Count	>1/16" Debitage Count	>1/4" Debitage Net Weight (g)	>1/8" Debitage Net Weight (g)	>1/16" Debitage Net Weight (g)	FCR >1/4"	FCR >1/8"	FCR >1/16"	FCR Net Weight (g)	Notes
C01	11/7/2017	11/27-12/1/17	N905	E990	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
C02	11/7/2017	11/27-12/1/17	N910	E990	28	Loss	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C03	11/7/2017	11/27-12/1/17	N915	E990	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
C04	11/7/2017	11/27-12/1/17	N920	E990	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C05	11/7/2017	11/27-12/1/17	N925	E990	26	Loss	74	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C06	11/7/2017	11/27-12/1/17	N930	E990	8	Loss	23	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C07	11/7/2017	11/27-12/1/17	N935	E990	15	Loss	43	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C08	11/7/2017	11/27-12/1/17	N940	E990	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C09	11/7/2017	11/27-12/1/17	N945	E990	25	Loss	72	1	0	0	0	0	0	0	0	0	0	0	No cultural material. Soil core located on edge of Phase II TU N945 E989.5.
C10	11/7/2017	11/27-12/1/17	N950	E990	27	Loss	77	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C11	11/7/2017	11/27-12/1/17	N955	E990	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C12	11/7/2017	11/27-12/1/17	N960	E990	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
C13	11/7/2017	11/27-12/1/17	N965	E990	30	N/A	86	1	0	0	0	0	0	0	1	0	0	30.2	Crazed rhyolite FCR at surface.
C14	11/7/2017	11/27-12/1/17	N970	E990	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material. Soil core located on edge of Phase II TU N968 E989.5.
C15	11/7/2017	11/27-12/1/17	N975	E990	12	Loss	34	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C16	11/7/2017	11/27-12/1/17	N980	E990	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C17	11/7/2017	11/27-12/1/17	N985	E990	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C18	11/7/2017	11/27-12/1/17	N990	E990	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C19	11/7/2017	11/27-12/1/17	N995	E990	22	Loss	63	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C20	11/7/2017	11/27-12/1/17	N1000	E990	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
C21	11/7/2017	11/27-12/1/17	N1005	E990	28	Stone	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D01	11/7/2017	11/27-12/1/17	N905	E985	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
D02	11/7/2017	11/27-12/1/17	N910	E985	15	Loss	43	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D03	11/7/2017	11/27-12/1/17	N915	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D04	11/7/2017	11/27-12/1/17	N920	E985	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
D05	11/7/2017	11/27-12/1/17	N925	E985	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
D06	11/7/2017	11/27-12/1/17	N930	E985	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material. Soil core located within Phase II TU N929 E984.
D07	11/7/2017	11/27-12/1/17	N935	E985	28	Stone	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D08	11/7/2017	11/27-12/1/17	N940	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D09	11/7/2017	11/27-12/1/17	N945	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D10	11/7/2017	11/27-12/1/17	N950	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D11	11/7/2017	11/27-12/1/17	N955	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D12	11/7/2017	11/27-12/1/17	N960	E985	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
D13	11/7/2017	11/27-12/1/17	N965	E985	18	Loss	52	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D14	11/7/2017	11/27-12/1/17	N970	E985	15	Loss	43	1	0	0	0	0	0	0	1	0	0	2.5	Crazed rhyolite FCR.
D15	11/7/2017	11/27-12/1/17	N975	E985	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D16	11/7/2017	11/27-12/1/17	N980	E985	22	Loss	63	1	0	0	1	0	0	0.04	0	0	0	0	Unidentified chert - brown, dull luster.
D17	11/7/2017	11/27-12/1/17	N985	E985	30	N/A	86	1	0	1	0	0	0.04	0	0	0	0	0	Ten Mile Creek chert.
D18	11/7/2017	11/27-12/1/17	N990	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.

*Yellow-highlighted samples were positive for microartifacts
*Blue-highlighted samples were positive for artifacts at ground surface or other cultural information

Table 1
Microdebitage Coring Results*

3/4-inch Diameter Core ID	Coring Date	Water Screen Date	Northing	Easting	Soil Recovery (cm)	Nature of Rejection	Retained Soil Volume (cm3)	Soil Horizons Observed	>1/4" Debitage Count	>1/8" Debitage Count	>1/16" Debitage Count	>1/4" Debitage Net Weight (g)	>1/8" Debitage Net Weight (g)	>1/16" Debitage Net Weight (g)	FCR >1/4"	FCR >1/8"	FCR >1/16"	FCR Net Weight (g)	Notes
D19	11/7/2017	11/27-12/1/17	N995	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
D20	11/7/2017	11/27-12/1/17	N1000	E985	30	N/A	86	1	0	1	0	0	0.04	0	0	0	0	0	Ten Mile Creek chert.
D21	11/7/2017	11/27-12/1/17	N1005	E985	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E01	11/7/2017	11/27-12/1/17	N905	E980	22	Loss	63	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E02	11/7/2017	11/27-12/1/17	N910	E980	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
E03	11/7/2017	11/27-12/1/17	N915	E980	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
E04	11/7/2017	11/27-12/1/17	N920	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E05	11/7/2017	11/27-12/1/17	N925	E980	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
E06	11/7/2017	11/27-12/1/17	N930	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E07	11/7/2017	11/27-12/1/17	N935	E980	30	N/A	86	2	0	1	0	0	0.04	0	0	0	0	0	Ten Mile Creek chert.
E08	11/7/2017	11/27-12/1/17	N940	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E09	11/7/2017	11/27-12/1/17	N945	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E10	11/7/2017	11/27-12/1/17	N950	E980	30	N/A	86	1	0	1	0	0	0.04	0	0	0	0	0	Cedarville/Guelph chert.
E11	11/7/2017	11/27-12/1/17	N955	E980	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
E12	11/7/2017	11/27-12/1/17	N960	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E13	11/7/2017	11/27-12/1/17	N965	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E14	11/7/2017	11/27-12/1/17	N970	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E15	11/7/2017	11/27-12/1/17	N975	E980	27	Loss	77	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E16	11/7/2017	11/27-12/1/17	N980	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E17	11/7/2017	11/27-12/1/17	N985	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E18	11/7/2017	11/27-12/1/17	N990	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E19	11/7/2017	11/27-12/1/17	N995	E980	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
E20	11/7/2017	11/27-12/1/17	N1000	E980	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
E21	11/7/2017	11/27-12/1/17	N1005	E980	27	Loss	77	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F01	11/8/2017	11/27-12/1/17	N905	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F02	11/8/2017	11/27-12/1/17	N910	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F03	11/8/2017	11/27-12/1/17	N915	E975	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F04	11/8/2017	11/27-12/1/17	N920	E975	25	Loss	72	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F05	11/8/2017	11/27-12/1/17	N925	E975	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
F06	11/8/2017	11/27-12/1/17	N930	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F07	11/8/2017	11/27-12/1/17	N935	E975	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
F08	11/8/2017	11/27-12/1/17	N940	E975	28	Loss	80	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
F09	11/8/2017	11/27-12/1/17	N945	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F10	11/8/2017	11/27-12/1/17	N950	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F11	11/8/2017	11/27-12/1/17	N955	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F12	11/8/2017	11/27-12/1/17	N960	E975	23	Loss	66	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F13	11/8/2017	11/27-12/1/17	N965	E975	30	N/A	86	1	0	1	0	0	0.04	0	0	0	0	0	Cedarville/Guelph chert.
F14	11/8/2017	11/27-12/1/17	N970	E975	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
F15	11/8/2017	11/27-12/1/17	N975	E975	28	Loss	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F16	11/8/2017	11/27-12/1/17	N980	E975	18	Loss	52	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F17	11/8/2017	11/27-12/1/17	N985	E975	13	Loss	37	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F18	11/8/2017	11/27-12/1/17	N990	E975	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.

*Yellow-highlighted samples were positive for microartifacts
*Blue-highlighted samples were positive for artifacts at ground surface or other cultural information

Table 1
Microdebitage Coring Results*

3/4-inch Diameter Core ID	Coring Date	Water Screen Date	Northing	Easting	Soil Recovery (cm)	Nature of Rejection	Retained Soil Volume (cm3)	Soil Horizons Observed	>1/4" Debitage Count	>1/8" Debitage Count	>1/16" Debitage Count	>1/4" Debitage Net Weight (g)	>1/8" Debitage Net Weight (g)	>1/16" Debitage Net Weight (g)	FCR >1/4"	FCR >1/8"	FCR >1/16"	FCR Net Weight (g)	Notes
F19	11/8/2017	11/27-12/1/17	N995	E975	12	Loss	34	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F20	11/8/2017	11/27-12/1/17	N1000	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
F21	11/8/2017	11/27-12/1/17	N1005	E975	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
G01	11/8/2017	11/27-12/1/17	N905	E970	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
G02	11/8/2017	11/27-12/1/17	N910	E970	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
G03	11/8/2017	11/27-12/1/17	N915	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G04	11/8/2017	11/27-12/1/17	N920	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G05	11/8/2017	11/27-12/1/17	N925	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G06	11/8/2017	11/27-12/1/17	N930	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G07	11/8/2017	11/27-12/1/17	N935	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G08	11/8/2017	11/27-12/1/17	N940	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G09	11/8/2017	11/27-12/1/17	N945	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G10	11/8/2017	11/27-12/1/17	N950	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G11	11/8/2017	11/27-12/1/17	N955	E970	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
G12	11/8/2017	11/27-12/1/17	N960	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G13	11/8/2017	11/27-12/1/17	N965	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G14	11/8/2017	11/27-12/1/17	N970	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G15	11/8/2017	11/27-12/1/17	N975	E970	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
G16	11/8/2017	11/27-12/1/17	N980	E970	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
G17	11/8/2017	11/27-12/1/17	N985	E970	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
G18	11/8/2017	11/27-12/1/17	N990	E970	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
G19	11/8/2017	11/27-12/1/17	N995	E970	15	Loss	43	1	0	0	0	0	0	0	4	0	0	3.4	Crazed sandstone FCR.
G20	11/8/2017	11/27-12/1/17	N1000	E970	30	N/A	86	2	0	1	0	0	0.04	0	0	0	0	0	Flint Ridge (Moss Agate?) chert.
G21	11/8/2017	11/27-12/1/17	N1005	E970	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H01	11/8/2017	11/27-12/1/17	N905	E965	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
H02	11/8/2017	11/27-12/1/17	N910	E965	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
H03	11/8/2017	11/27-12/1/17	N915	E965	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
H04	11/8/2017	11/27-12/1/17	N920	E965	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
H05	11/8/2017	11/27-12/1/17	N925	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H06	11/8/2017	11/27-12/1/17	N930	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H07	11/8/2017	11/27-12/1/17	N935	E965	12	Stone	34	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H08	11/8/2017	11/27-12/1/17	N940	E965	15	Loss	43	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H09	11/8/2017	11/27-12/1/17	N945	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H10	11/8/2017	11/27-12/1/17	N950	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H11	11/8/2017	11/27-12/1/17	N955	E965	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
H12	11/8/2017	11/27-12/1/17	N960	E965	20	Stone	57	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
H13	11/8/2017	11/27-12/1/17	N965	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H14	11/8/2017	11/27-12/1/17	N970	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H15	11/8/2017	11/27-12/1/17	N975	E965	8	Stone	23	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H16	11/8/2017	11/27-12/1/17	N980	E965	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
H17	11/8/2017	11/27-12/1/17	N985	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H18	11/8/2017	11/27-12/1/17	N990	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.

*Yellow-highlighted samples were positive for microartifacts
*Blue-highlighted samples were positive for artifacts at ground surface or other cultural information

Table 1
Microdebitage Coring Results*

3/4-inch Diameter Core ID	Coring Date	Water Screen Date	Northing	Easting	Soil Recovery (cm)	Nature of Rejection	Retained Soil Volume (cm3)	Soil Horizons Observed	>1/4" Debitage Count	>1/8" Debitage Count	>1/16" Debitage Count	>1/4" Debitage Net Weight (g)	>1/8" Debitage Net Weight (g)	>1/16" Debitage Net Weight (g)	FCR >1/4"	FCR >1/8"	FCR >1/16"	FCR Net Weight (g)	Notes
H19	11/8/2017	11/27-12/1/17	N995	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H20	11/8/2017	11/27-12/1/17	N1000	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
H21	11/8/2017	11/27-12/1/17	N1005	E965	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
I01	11/8/2017	11/27-12/1/17	N905	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I02	11/8/2017	11/27-12/1/17	N910	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I03	11/8/2017	11/27-12/1/17	N915	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I04	11/8/2017	11/27-12/1/17	N920	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I05	11/8/2017	11/27-12/1/17	N925	E960	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
I06	11/8/2017	11/27-12/1/17	N930	E960	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
I07	11/8/2017	11/27-12/1/17	N935	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I08	11/8/2017	11/27-12/1/17	N940	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I09	11/8/2017	11/27-12/1/17	N945	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I10	11/8/2017	11/27-12/1/17	N950	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I11	11/8/2017	11/27-12/1/17	N955	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I12	11/8/2017	11/27-12/1/17	N960	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I13	11/8/2017	11/27-12/1/17	N965	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I14	11/8/2017	11/27-12/1/17	N970	E960	30	N/A	86	2	0	0	1	0	0	0.04	0	0	0	0	Cedarville/Guelph chert
I15	11/8/2017	11/27-12/1/17	N975	E960	30	N/A	86	1	1	0	0	2.3	0	0	0	0	0	0	Cedarville/Guelph chert utilized flake at surface.
I16	11/8/2017	11/27-12/1/17	N980	E960	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material. Soil core located on edge of Phase II TU N979 E958.
I17	11/8/2017	11/27-12/1/17	N985	E960	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
I18	11/8/2017	11/27-12/1/17	N990	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I19	11/8/2017	11/27-12/1/17	N995	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I20	11/8/2017	11/27-12/1/17	N1000	E960	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
I21	11/8/2017	11/27-12/1/17	N1005	E960	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J01	11/8/2017	11/27-12/1/17	N905	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J02	11/8/2017	11/27-12/1/17	N910	E955	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
J03	11/8/2017	11/27-12/1/17	N915	E955	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
J04	11/8/2017	11/27-12/1/17	N920	E955	27	Loss	77	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J05	11/8/2017	11/27-12/1/17	N925	E955	26	Loss	74	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J06	11/8/2017	11/27-12/1/17	N930	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J07	11/8/2017	11/27-12/1/17	N935	E955	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
J08	11/8/2017	11/27-12/1/17	N940	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J09	11/8/2017	11/27-12/1/17	N945	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J10	11/8/2017	11/27-12/1/17	N950	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J11	11/8/2017	11/27-12/1/17	N955	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J12	11/8/2017	11/27-12/1/17	N960	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J13	11/8/2017	11/27-12/1/17	N965	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J14	11/8/2017	11/27-12/1/17	N970	E955	28	Loss	80	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
J15	11/8/2017	11/27-12/1/17	N975	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J16	11/8/2017	11/27-12/1/17	N980	E955	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.

*Yellow-highlighted samples were positive for microartifacts
*Blue-highlighted samples were positive for artifacts at ground surface or other cultural information

Table 1
Microdebitage Coring Results*

3/4-inch Diameter Core ID	Coring Date	Water Screen Date	Northing	Easting	Soil Recovery (cm)	Nature of Rejection	Retained Soil Volume (cm3)	Soil Horizons Observed	>1/4" Debitage Count	>1/8" Debitage Count	>1/16" Debitage Count	>1/4" Debitage Net Weight (g)	>1/8" Debitage Net Weight (g)	>1/16" Debitage Net Weight (g)	FCR >1/4"	FCR >1/8"	FCR >1/16"	FCR Net Weight (g)	Notes
J17	11/8/2017	11/27-12/1/17	N985	E955	15	Loss	43	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J18	11/8/2017	11/27-12/1/17	N990	E955	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
J19	11/8/2017	11/27-12/1/17	N995	E955	25	Stone	72	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
J20	11/8/2017	11/27-12/1/17	N1000	E955	28	Loss	80	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
J21	11/8/2017	11/27-12/1/17	N1005	E955	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K01	11/8/2017	11/27-12/1/17	N905	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K02	11/8/2017	11/27-12/1/17	N910	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K03	11/8/2017	11/27-12/1/17	N915	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K04	11/8/2017	11/27-12/1/17	N920	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K05	11/8/2017	11/27-12/1/17	N925	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K06	11/8/2017	11/27-12/1/17	N930	E950	30	N/A	86	1	0	0	1	0	0	0.04	0	0	0	0	Unidentified pale brown chert (Kenneth?).
K07	11/8/2017	11/27-12/1/17	N935	E950	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
K08	11/8/2017	11/27-12/1/17	N940	E950	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
K09	11/8/2017	11/27-12/1/17	N945	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K10	11/8/2017	11/27-12/1/17	N950	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K11	11/8/2017	11/27-12/1/17	N955	E950	28	Loss	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
K12	11/8/2017	11/27-12/1/17	N960	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K13	11/8/2017	11/27-12/1/17	N965	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K14	11/8/2017	11/27-12/1/17	N970	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K15	11/8/2017	11/27-12/1/17	N975	E950	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
K16	11/8/2017	11/27-12/1/17	N980	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K17	11/8/2017	11/27-12/1/17	N985	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K18	11/8/2017	11/27-12/1/17	N990	E950	30	N/A	86	2	0	0	1	0	0	0.04	0	0	0	0	Cedarville/Guelph chert.
K19	11/8/2017	11/27-12/1/17	N995	E950	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
K20	11/8/2017	11/27-12/1/17	N1000	E950	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
K21	11/8/2017	11/27-12/1/17	N1005	E950	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L01	11/9/2017	11/27-12/1/17	N905	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L02	11/9/2017	11/27-12/1/17	N910	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L03	11/9/2017	11/27-12/1/17	N915	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
L04	11/9/2017	11/27-12/1/17	N920	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
L05	11/9/2017	11/27-12/1/17	N925	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
L06	11/9/2017	11/27-12/1/17	N930	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L07	11/9/2017	11/27-12/1/17	N935	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L08	11/9/2017	11/27-12/1/17	N940	E945	15	Stone	43	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L09	11/9/2017	11/27-12/1/17	N945	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L10	11/9/2017	11/27-12/1/17	N950	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L11	11/9/2017	11/27-12/1/17	N955	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L12	11/9/2017	11/27-12/1/17	N960	E945	27	Loss	77	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L13	11/9/2017	11/27-12/1/17	N965	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L14	11/9/2017	11/27-12/1/17	N970	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
L15	11/9/2017	11/27-12/1/17	N975	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
L16	11/9/2017	11/27-12/1/17	N980	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.

*Yellow-highlighted samples were positive for microartifacts
*Blue-highlighted samples were positive for artifacts at ground surface or other cultural information

Table 1
Microdebitage Coring Results*

3/4-inch Diameter Core ID	Coring Date	Water Screen Date	Northing	Easting	Soil Recovery (cm)	Nature of Rejection	Retained Soil Volume (cm3)	Soil Horizons Observed	>1/4" Debitage Count	>1/8" Debitage Count	>1/16" Debitage Count	>1/4" Debitage Net Weight (g)	>1/8" Debitage Net Weight (g)	>1/16" Debitage Net Weight (g)	FCR >1/4"	FCR >1/8"	FCR >1/16"	FCR Net Weight (g)	Notes
L17	11/9/2017	11/27-12/1/17	N985	E945	28	Loss	80	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L18	11/9/2017	11/27-12/1/17	N990	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
L19	11/9/2017	11/27-12/1/17	N995	E945	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
L20	11/9/2017	11/27-12/1/17	N1000	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
L21	11/9/2017	11/27-12/1/17	N1005	E945	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M01	11/9/2017	11/27-12/1/17	N905	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M02	11/9/2017	11/27-12/1/17	N910	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M03	11/9/2017	11/27-12/1/17	N915	E940	28	Loss	80	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M04	11/9/2017	11/27-12/1/17	N920	E940	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
M05	11/9/2017	11/27-12/1/17	N925	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M06	11/9/2017	11/27-12/1/17	N930	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M07	11/9/2017	11/27-12/1/17	N935	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M08	11/9/2017	11/27-12/1/17	N940	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M09	11/9/2017	11/27-12/1/17	N945	E940	20	Stone	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
M10	11/9/2017	11/27-12/1/17	N950	E940	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
M11	11/9/2017	11/27-12/1/17	N955	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M12	11/9/2017	11/27-12/1/17	N960	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M13	11/9/2017	11/27-12/1/17	N965	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M14	11/9/2017	11/27-12/1/17	N970	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M15	11/9/2017	11/27-12/1/17	N975	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M16	11/9/2017	11/27-12/1/17	N980	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M17	11/9/2017	11/27-12/1/17	N985	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M18	11/9/2017	11/27-12/1/17	N990	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M19	11/9/2017	11/27-12/1/17	N995	E940	30	N/A	86	2	0	0	0	0	0	0	0	0	0	0	No cultural material.
M20	11/9/2017	11/27-12/1/17	N1000	E940	30	N/A	86	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
M21	11/9/2017	11/27-12/1/17	N1005	E940	20	Loss	57	1	0	0	0	0	0	0	0	0	0	0	No cultural material.
								Totals	***2***	***7***	***4***	***6.8***	***0.3***	***0.1***	***6***	***0***	***0***	***36.1***	

*Yellow-highlighted samples were positive for microartifacts
*Blue-highlighted samples were positive for artifacts at ground surface or other cultural information

APPENDIX D
INCIDENTAL SURFACE FINDS

Figure D1: Incidental Surface Finds
Stage 1 Field Activities, 33HY0167
Napoleon, Ohio

Notes
The Henry County photography, dated April 2011, is provided by OGRIP as part of the Ohio Statewide Imagery Program.

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Table D1
Incidental Surface Finds, Geomorphological Assessment

Bag #	Object #	Phase of Investigation	UTM Zone	UTM Easting	UTM Northing	OAI #	Survey Method	Horizontal Provenience	Vertical Provenience	Associated Anomaly	Feature Provenience	Material Variety	Artifact Type	Artifact Subtype	Point Type	Period/Date	Reference	Weight (g)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Retouched 1=Y 0=N	Utilized 1=Y 0=N	Heat Treated 1=Y 0=N	Cortex 1=Y 0=N	Comments
N/A	N/A	Phase III, Stage 1	16	742231.825	4587375.22	33HY0167	Pedestrian	Point #1	Surface			Cedarville / Guelph	Biface	Projectile Point	Unidentified			1.5	28	15	4	1	1	0	0	Distal end of a small projectile point. The base is missing and it is not possible to determine the length of the tool.
N/A	N/A	Phase III, Stage 1	16	742221.884	4587379.67	33HY0167	Pedestrian	Point #2	Surface			Cedarville / Guelph	Biface	Projectile Point	Unidentified			1.7	12	12	8	0	0	0	0	Longitudinally-split projectile point base with shallow side notch and beveled base; notch is possibly a bifurcation, but the removal at that location is small enough and piece so fragmentary that the bifurcate appearance may be incidental.