

Chapter 1. Introduction

1.1. Scope and Purpose

This document presents guidelines for conducting archaeological work in Iowa. The purpose of these guidelines is to provide a consistent and high quality approach to archaeology in Iowa. Since archaeological resources are non-renewable (and often not readily apparent to the casual observer), it is important to undertake investigations according to carefully devised research plans that cause minimal harm to the properties while identifying and recovering the most critical and significant data.

Each project area and all archaeological sites are unique, and the different situations encountered within a project area or at a site will require different methods of archaeological investigation. This document recognizes the need for the procedures of historic preservation to be flexible to meet changing scientific and professional practices. These guidelines leave many aspects of field procedures to the discretion of archaeological researchers or federal and state agencies, and acknowledge the fact that it is the responsibility and prerogative of the principal investigator or agency to determine and implement appropriate investigative methods. Development and implementation of alternative field procedures not discussed in these guidelines is acceptable and encouraged as long as the methods are fully explained and substantiated.

These guidelines are intended to: (1) summarize current best practices, as established by a consensus of professional archaeologists interested in the study and preservation of archaeological resources in Iowa; (2) assist agencies, consultants, individuals, and other stakeholders in meeting the objectives of state and national historic preservation legislation and implementing regulations such as Section 106 of the National Historic Preservation Act, at the federal level; (3) facilitate the consistent application of archaeological methods and techniques by archaeologists; (4) provide baseline methods for compiling the data and information that are needed for agencies and officials to provide consistent reviews of projects submitted for compliance with federal and state preservation laws; and (5) outline an approach that is accepted as thorough research for all archaeology in the state of Iowa.

It is of special importance to emphasize that this document is not regulatory in any manner and does not intend to imply any type of mandate from any government agency or official. The AIA does, however, encourage all stakeholders to observe and practice the guidance offered in this document.

The present document is a revision of “Guidelines for Conducting Archaeological Investigations in Iowa”, compiled and edited by Kira Kaufmann in 1999. The focus of this new edition is on the topics for which the Guidelines have proven most valuable over the past two decades: the actual conduct of archaeological investigations in Iowa. Whereas the 1999 edition was written primarily from the perspective of how federal guidelines for archaeological investigation were applied in Iowa, the current edition re-organizes the discussion in terms of the process actually followed in Iowa – specifically, the phased approach that is well understood by those directly involved in historic preservation, but not so well by stakeholders such as developers or permit applicants outside the archaeological community.

1.2. Intended Users

These archaeological investigation guidelines are intended for two basic types of audiences: (1) those involved in regulatory or compliance archaeology and (2) those conducting archaeology outside of regulatory activities. This chapter defines the types of individuals, organizations, or agencies that may find these guidelines pertinent or informative.

Regulatory archaeology involves assisting agencies and their applicants in fulfilling requirements according to federal, state, or local preservation laws. In regulatory archaeology, the authoritative

Register eligibility for prehistoric sites or experience and training in historical archaeology in order to make recommendations of significance and National Register eligibility for historical archaeological sites. A professional geomorphologist may not be necessary on every archaeological project. However, an archaeological consultant should have sufficient geomorphological knowledge appropriate for the project needs. For more complex projects, a professional geomorphologist is recommended. A professional geomorphologist should have sufficient training to adequately evaluate the sedimentology, stratigraphy, and pedology of deposits in the field and be able to describe and analyze the deposits using standard terminology and methods (detailed under Geomorphological Methods, below). The geomorphologist should have or be near completion of a post-graduate degree in an earth-science field (geology, physical geography, pedology, Quaternary studies), or have demonstrated professional expertise in field geomorphology through experience and publications. Previous fieldwork experience in the Upper Midwest is recommended to ensure an adequate knowledge of regional stratigraphy, soils, and research issues. **It is the responsibility of the project Principal Investigator and the geomorphologist to integrate the geomorphological investigation into those aspects of the project where questions of context and site preservation potential need to be addressed.**

Chapter 2. Archaeological Procedures

2.1. Levels of Archaeological Investigation

Archaeological investigations in Iowa can be broadly grouped into one of five types (Table 1); these categories form a research continuum with fuzzy boundaries, although several important distinctions can be identified. Desktop Assessments are typically a part of every investigation, but sometimes are conducted as a planning step and in all cases do not involve field visits. Phase IA reconnaissance includes everything a desktop assessment involves and adds a field visit component. Phase I intensive survey includes what is accomplished in desktop assessment and

Phase IA reconnaissance but explicitly involves application of systematically applied field methods to discover, record, and report archaeological sites. Phase II testing confirms context and establishes National Register of Historic Places (NRHP) eligibility. Phase III is typically, for archaeological sites, mitigation in the form of large-scale data recovery excavation guided by an approved data recovery plan and, where required, legal agreement documents. In all these types of investigation the AIA emphasizes the importance of geomorphological information on landscape, site location, and context—it is imperative that practicing archaeologists take into consideration geomorphological data in planning and executing their field investigations, and in the interpreting of results.

Results of the survey should be documented and should include all pertinent information outlined in Chapter 5.

Human burials, human remains, and associated grave goods are protected by law in Iowa. If suspected human remains or burials are encountered, stop all work in the area, cover the remains, and immediately contact the OSA Bioarchaeology Director. Prehistoric mounds in Iowa typically serve as human mortuary locations, and should be treated as such.

Field work when the ground is frozen is unacceptable since frozen soils cannot be properly screened and evaluated. If snow is affecting surface visibility the study area must be treated as a low visibility condition subject to subsurface sampling procedures. Excessive snow cover may obscure important landscape features and prevent adequate survey coverage. In emergency situations where winter work is required, consultation and agreement with SHPO about methods before field work occurs is necessary and justification will be required for an exception.

2.3.1. Pre-Field Methods

Prior to beginning any field work, the project archaeologist should review all pertinent information about the location to ensure that a field survey is truly needed, that previously recorded or suspected archaeological or historical sites are taken into account, and that no inadvertent damage to sites is caused by field testing. Listed here are resources which should be reviewed and evaluated; this is not a comprehensive list, but a basic list relevant to almost all surveys:

- The Iowa Site File (ISF)
 - ✓ review any site with human remains with the OSA Bioarchaeology Director before field work begins
 - ✓ review sites previously determined to be NRHP eligible or unevaluated with SHPO
 - Maps of areas previously surveyed for archaeology (included on I-Sites GIS)
 - ✓ survey boundaries are not always exact (consult original reports)
 - ✓ older surveys may not meet current AIA Guidelines (areas may require resurvey)
 - ✓ review previous surveys of nearby similar landforms to plan for soils likely to be encountered
 - United States Department of Agriculture—Natural Resources Conservation Service (USDA-NRCS) soil surveys
 - ✓ identify a project area's setting and soils
 - ✓ evaluative site preservation potential
 - ✓ plan subsurface testing
 - ✓ identify landforms (soil surveys are approximations and should be used for pre-field guidance only)
 - Other GIS map layers (all useful but imprecise and must be interpreted carefully)
 - ✓ location of NRHP sites and districts
 - ✓ OSA's Notable Locations map showing cemeteries and suspected or poorly defined sites
 - ✓ OSA's Historic Indian Locations Database, which shows historical locations of post-contact Native Americans
 - ✓ lidar hillshades can reveal possible mounds or other significant features
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- ✓ Landscape Model for Archaeological Site Suitability (LANDMASS) predicts suitability of a particular upland landform position for prehistoric habitation.
- Historic maps and local histories
 - ✓ General Land Office survey maps often show the location of early historic features
 - ✓ county plat maps also show the location of historical features and the names of landowners
 - ✓ nineteenth and early twentieth century Sanborn fire insurance maps
 - ✓ historic aerials are available from the 1930s on
 - ✓ county and local histories can help reveal the historical significance of past occupants or activities
- Local knowledge about area's archaeological and historical resources

2.3.2. Field Methods

Provided below are field methods that are considered in Iowa to be appropriate for conducting intensive-level archaeological investigations. Regardless of field techniques employed, the Principal Investigator must design the survey so that the methods follow a rationale justifiable for the archaeological investigation of a specific project and its unique setting. The rationale must be presented in the project report in sufficient detail such that other professionals may understand and evaluate its effectiveness. Toward this end, preliminary archival research must be performed in advance of commencing field investigation to inform survey crews of known resources in and around the study area and to familiarize staff of current field conditions. Iowa One-Call utility location is legally required in Iowa two business days prior to any subsurface testing.

Pedestrian reconnaissance survey in tilled agricultural fields should employ the following graduated transect intervals based upon ground surface visibility (GSV) and surface condition.

| <u>GSV</u> | <u>Condition</u> | <u>Survey Interval</u> |
|---------------|--------------------------------|------------------------|
| 80 - 100% | Rain washed/weathered | 15 meters |
| " " | Freshly turned | 10 meters |
| 40 - 80% | Any condition | 10 meters |
| 25 - 40% | Rain washed/weathered | 5 meters |
| " " | Freshly turned | 3 meters |
| Less than 25% | Systematic subsurface sampling | |

Pedestrian survey transects should be recorded in systematic fashion in a grid or other established pattern. Temporally or stylistically diagnostic artifacts recovered from a pedestrian survey should be collected, their location documented, and maintained for analysis. Common artifacts with low research value, such as heated or introduced rock, historic masonry, or abundant artifact types can be sampled if the quantity and sampling methods are documented in the report. Different variables pertaining to pedestrian surface survey such as surface visibility, surface conditions, vegetation, or potential for hazardous waste should be addressed.

Subsurface testing and coring in tilled agricultural fields typically should be conducted in order to demonstrate depth of the plowzone, verify soil types, and evaluate potential for buried cultural deposits and features. The number and size of subsurface tests should be explained and justified in the Methods section of the final report. On their own, systematic pedestrian surveys are not usually sufficient to evaluate integrity or determine the NRHP eligibility for sites identified within a study area.

of on-site discard is something that should also be considered with a thought toward potential impacts on future investigation. Furthermore, artifact assemblages generated from NRHP –listed or –eligible sites should be considered differently than those from sites that have been evaluated as ineligible.

When an archaeological site is encountered, either prehistoric or historic, an attempt should be made to assess the site's integrity and potential for intact and/or buried deposits. If possible an attempt should also be made to assess the site's historic significance and National Register eligibility. The definition of an archaeological site in Iowa can be found in Chapter 6; Iowa does not use "findspot," "isolated find," or other nomenclature sometimes in use in other states. Investigating archaeologists should use their professional judgment in defining the extent of archaeological site boundaries. If necessary, *National Register Bulletin Numbers 21 and 24* (Seifert 1995; Derry and Parker 1985) should be consulted in establishing site boundaries, particularly when a site is recommended as NRHP eligible and referenced as appropriate.

The State Archaeologist at the University of Iowa–Office of the State Archaeologist (OSA) assigns official Iowa site numbers to sites identified. The decision to assign a state site number is at the discretion of the OSA. All archaeological sites discovered should be recorded on an "Iowa Archaeological Site Form" and submitted to OSA for processing. The current procedures for submitting site information to OSA is found in Chapter 6. OSA site numbers must be used in any project reports submitted to the SHPO. Temporary field numbers are not acceptable, and the SHPO will return such reports to the sponsoring agency without review.

If possible and appropriate, a preliminary evaluation of each prehistoric or historical archaeological site should consist of a statement describing its eligibility for inclusion in the National Register of Historic Places according to Criteria A, B, C, or D; an assessment of the site's condition; and its significance and research potential within the relevant historic context(s). The evaluation should include background research for each historical archaeological site that focuses on the historical occupation of the site, particularly the dates of occupation, who occupied the site, and site function through time. Background research for each prehistoric archaeological site should focus on the prehistoric component(s) at the site and within the area, particularly the range of occupation at the site if available and site function (through time if a multi-component prehistoric site).

In some cases, it may be necessary for an archaeologist to employ supplemental techniques at the Phase I level to assist with identification of archaeological sites within a project area. These techniques may include, but are not limited to, systematic close interval probing or shovel/auger testing, detailed geomorphological investigation, and geophysical survey. In addition, supplemental Phase I survey outside of a defined project area may be necessary to fully define site boundaries.

2.4. Phase II Archaeological Testing (a.k.a. Evaluation)

2.4.1 Purpose

The purpose of Phase II testing, or Evaluation, is to determine if an identified cultural resource is eligible for inclusion in the National Register of Historic Places (NRHP). Site testing takes place when additional information is needed in order to determine whether a site meets the defined criteria for inclusion in the NRHP. Testing also may be conducted on an eligible site in order to collect information to develop an appropriate data recovery or preservation plan. At completion, the Phase II investigation should conclusively state whether the resource is eligible or not eligible for inclusion on the NRHP. All archaeological work involving Phase II investigations should be conducted in consultation with the SHPO.

Under the *Secretary of the Interior's Guidelines for Identification* (National Park Service 1983), there is no distinction between Phase I survey (identification) and Phase II testing (evaluation) under the intensive survey. This distinction has developed due to the common categorization of

these types of activities by SHPOs, archaeological consultants, and federal and state agencies in order to allow for assessment of project effects on NRHP-eligible or unevaluated archaeological sites. After an identification survey (either a Phase IA reconnaissance survey and/or a Phase I intensive survey) has been conducted, an assessment of how a site will be affected by a project may define what types of additional archaeological investigations are appropriate or necessary. For regulatory archaeology, additional investigations are necessary only if the site identified has been determined to be eligible for the National Register of Historic Places warranting the need for further evaluation or mitigation of adverse effects.

For certain types of projects, it may be feasible and cost effective to combine Phase I survey (identification) and Phase II testing (evaluation) activities as part of one investigation. However, for other types of projects, it may be more efficient to maintain the distinction between identification and evaluation activities for intensive surveys. It is sometimes desirable to roll Phase II investigation and Phase III data recovery excavations together when circumstances allow and an agreement implementing such a strategy has been executed. Federal and state agencies and their applicants have varying cultural resource management needs. Prior to soliciting bids from archaeological consultants, they determine what types of archaeological identification and evaluation investigations discussed above are appropriate or necessary in order to address cultural resource concerns for a project. It is their responsibility to clearly express to the archaeological consultant what types of archaeological investigations are needed for a project and the boundaries of the project area. By establishing the project area dimensions and what types of archaeological investigations are necessary, archaeological consultants will understand what they are being requested to do, and in return, they can provide more accurate cost proposals for completing the work. If there is uncertainty about what types of archaeological investigation are necessary for a project, consultation with the SHPO archaeologist is recommended. It is important to remember that in the context of compliance archaeology, the archaeological consultant is employed as an expert to identify and delineate archaeological sites; to evaluate their significance, integrity, and National Register eligibility; and, if necessary, to assist in the mitigation of effects. At no point should the archaeological consultant assume the mandated roles and responsibilities of the agency or applicant.

2.4.2. Objectives

The objectives of Phase II archaeological evaluations may include some or all of the examples below:

- to describe the archaeological resources under investigation
- to define the horizontal and vertical limits and integrity of all archaeological resources being investigated
- to describe and interpret identifying characteristics of all archaeological resources, such as age, style, cultural association, etc. if not accomplished at an earlier phase of study
- to interpret all archaeological resources in terms of the activities, functions, time span, and historic context(s) they represent
- to pose research questions that can provide information on the archaeological resource's local or regional significance
- to compare the results of the investigations with other investigations, theories, or existing models
- to decisively evaluate the eligibility of the archaeological resource for the NRHP
- following the agency's assessment of effects, to identify possible treatment options.

The primary goals of Phase II investigations are to obtain detailed information on the integrity, limits, structure, function, cultural/historical context, temporal affiliation, and the importance of an

used at a site only after the site has been subjected to intensive surface collecting and testing through hand excavation of small, well-controlled provenience units. The use of power equipment should be left to the discretion of the Principal Investigator in consultation with the SHPO, and its application should legitimately aid in answering the specific research questions addressed in the research design. Backhoe trenching for the purposes of geomorphic profiling may be employed outside site boundaries in areas that have been previously surveyed with negative results.

2.4.8. Site Boundaries

Refining specific site boundaries is essential in coordinating site management and treatment strategies. If the site may extend beyond project limits, an attempt should still be made to determine the extent of the site beyond the project limits either by actual survey or estimation based on natural landform, if reasonably justifiable. If the site limits have been redefined by Phase II archaeological investigation, or there are any discrepancies from previous surveys, they should be described and accounted for in detail. The previously assigned Iowa site number should consistently be used for Phase II investigations. A supplemental Iowa site form should be filled out for any subsequent investigations at a previously identified site and submitted to the Office of the State Archaeologist and boundary adjustments should be noted.

There may be instances where site avoidance and preservation in place is the desired option to mitigate project effects. Buffers can only be applied when site boundaries have been confidently established through pedestrian reconnaissance and prescribed methods of subsurface sampling or where boundaries are reasonably inferred by natural topography (riverbank, terrace edge, ridge spur, etc). In the past, the OSA in consultation with the Indian Advisory Council has consistently recommended a protective buffer of 100 feet extending outward beyond the defined site boundary where mounds and burials are concerned. The 100-foot buffer is also recommended where non-mortuary related archaeological sites are involved. Larger buffers may be necessary depending on the nature of the site, its character-defining features and qualities of significance, and the types and magnitude of project effects. Smaller buffers may also be appropriate depending on the individual circumstance.

2.4.9. Collection and Curation

Collection of artifacts and curation of specimens during Phase II investigations should include all considerations discussed for Phase I survey report guidelines that are applicable to Phase II investigations. All artifacts, including fire-cracked rock, should be collected during controlled surface collections and test excavations. If possible all artifacts or specimens, diagnostic and undiagnostic, should be collected, retained for analyses, and curated. However, the Principal Investigator should determine if collection and curation of all artifacts is necessary and justified. A situation may dictate the collection and curation of only a representative sample of undiagnostic artifacts such as fire-cracked rock. Stratigraphic and horizontal control should be implemented and maintained during collection of materials recovered from Phase II investigations.

Artifacts should also be washed, labeled, cataloged, identified, tabulated, analyzed, and curated in accordance with the procedures established for Phase I investigations. Phase II investigations should also include a broader range of collection strategies than the Phase I survey that may include the collection of samples for flotation, floral analysis, faunal analysis, geomorphological research, chemical analysis, radiocarbon dating, or other forms of analysis. The samples of materials collected should be sufficient to address the questions detailed in the research design. Material samples should be collected and curated with a view towards future research or to answer possible future research questions not currently addressed.

The curation of artifacts and artifact collections recovered from federally owned or managed property is the responsibility of the federal land-managing agency. Artifacts and collections from state land are the property of the State of Iowa and curation is the responsibility of the controlling state agency. The AIA does not endorse long-term curation of artifacts or collections by

archaeological consultants or parent firms but instead recommends that collections are curated at an in-state repository that meets the SOI Standards for Curation.

2.4.10. Reports

Information that should be included in the final Phase II report should include all pertinent information discussed in Chapter 5, Reporting Guidelines. An account of all investigations conducted should be presented in the report.

Data management should include sufficient and appropriate documentation of recovered materials in the report. Where applicable, this information should include representative test unit and feature plan figures, soil profiles, test unit and feature profiles, artifact inventory tables, artifact drawings or photographs, etc. The final report should also include a copy of the research design and explanations or justifications of any deviations from the research design.

In order for recovered data to be useful, the data used for description, analysis, and as a basis for conclusions should be of sufficient detail and consistency to allow future researchers to arrive at similar conclusions, whether or not they agree. Opinions should be expressed but clearly distinguished from the objective data and recommendations stated in the report. Based on the recommendations, additional information can be included in an appendix in the final report. For example, if data recovery at the site is recommended, then proposed recommendations for data recovery methods may be added as an appendix. The SOI Standards for Archeological Documentation (National Park Service 1983) also recommend that the report describe the methods used, results of research, and where the project information is located.

2.5. Phase III Data Recovery

Phase III archaeological data recovery will pursue most if not all of the objectives discussed in the examples below:

- to describe the archaeological resource under investigation and the characteristics that make it significant and eligible for listing in the National Register
- to address and explicitly state pertinent hypotheses and research questions that provide valuable information on the local or regional significance of the archaeological resource with accompanying valid justifications of the hypotheses' and questions' importance and relevance to maximize the efficient and successful retrieval of important data relevant to the defined research questions from the archaeological resource
- to determine characteristics, variability, inter-site patterning, and intra-site patterning pertinent to the resource and the relevant historic context(s)
- to advocate public education/interpretation of the data recovery results

Appropriate treatment of an archaeological site recommended as, or determined eligible for, the NRHP includes any activity that:

- preserves the site itself

or, within a compliance setting, either:

- minimizes the effect(s) of an undertaking, or
- mitigates an undertaking's adverse effect on a significant cultural resource.

Whenever possible, an attempt should be made to preserve and protect significant archaeological resources in place. The preservation and protection of archaeological sites can be accomplished in

many different ways depending on a number of variables including but not limited to the location of the site, the types of proposed effects, and the amount of time available to implement the options.

Avoidance in and of itself is not considered a protection or preservation treatment technique. Successful protection and preservation options include developing conservation easements, redesigning the project to minimize effects to a site, or developing a Cultural Resources Management Plan for long term preservation. Other treatment options might include setting aside protected open spaces, fencing, site reburial, or revegetation.

When preservation of the site is not feasible in a compliance situation, minimizing the effects of an undertaking or mitigating the effects through data recovery, may be the appropriate treatment. The purpose of data recovery is to preserve the information contained in the site by its careful, extensive excavation, the thorough analysis of its contents, and a detailed report of findings. Phase III data recovery is generally undertaken as a mitigation measure through the Section 106 compliance process. The specific requirements of the Phase III investigation are negotiated by the federal agency undertaking the project, the SHPO/THPO, the Advisory Council on Historic Preservation, and other third party interests and are memorialized in a formal agreement between these parties.

2.5.1. Protection

A detailed management plan provides a framework for the proposed protection of an archaeological site. Designing a management plan involves defining the following:

- the responsible parties that will be involved
- the area of the archaeological site to be protected
- previous investigations that may be documented by referencing a site form or an archaeological report
- proposed investigations that may be documented by referencing a Data Recovery Plan, where appropriate
- the project that may affect the site and what the effects of property use will be
- the methods to be employed in protection of the site
- the methods to be employed for any other types of treatment to the site
- time frame for different aspects of the management plan
- professional qualifications of individuals who conduct any investigations
- procedures to be followed in the case of an unanticipated discovery
- any stipulations as appropriate to the situation to address dispute resolution
- any amendments
- maps and/or diagrams demarcating pertinent information such as site location, site limits, proposed protected areas, ownership, project activity location(s), etc.
- endorsement and execution by signature of the participating parties

Agreements or other types of legal documents generally encompass and implement management plans upon the concurrence of the responsible parties. Designing a management plan will result in a decision of which type of agreement or legal document will best suit the needs of the responsible parties and the resource involved.

Legal options or strategies that serve as an authoritative foundation for preservation and protection of an archaeological site in place are local environmental review, local designation or historic overlay zoning, local zoning or subdivision ordinances, agreements conditioned in sales

(covenants), transfers, leases, loans or grants, donations, limited partnerships, land trusts, or conservation easements.

On-site options or strategies for the private landowner or public agency to preserve and protect an archaeological site in place with legal mechanism are conservation easements, protected open space, buffer zones, or other alternative measures associated with agreement documents.

Conservation easements are legal instruments that regulate the use of the land by restrictions placed on the title of the land that may contain or be adjacent to an archaeological site. Conservation easements may provide protection that is stronger than an agreement document, zoning, or state regulations because the protection afforded by easements can be permanent. Easements legally bind all present and future owners of the land that an easement is placed upon regardless of how that land is transferred. The Iowa Natural Heritage Foundation's website (<http://www.inhf.org/>) can be consulted for details on conservation easements; the University of Iowa—Office of the State Archaeologist can serve as an easement holder. Contact the State Archaeologist for details.

A protected open space, green space, or buffer zone option recommends that the archaeological site area and/or an adjacent area remain undeveloped. This option may be combined with other options to aid in the protection of an archaeological site. This alternative provides protection for an archaeological site and must be specified in an official agreement document.

Burial as an option for site preservation or site protection refers to when an exposed archaeological site is covered with soil to prevent further damage, erosion, or to cover exposed archaeological materials. In some instances, a protective artificial covering should be placed on the archaeological site before it is reburied with soil. If long-term protection is the main goal in a particular reburial option, a landscape fabric type of protective ground cover should be used. Plastic tarp is considered a temporary protective covering when considering temporary reburial. Only soil originating from a known, non-archaeological source location should be used as infill.

If determined feasible and more practical, an archaeological resource may be protected from project effects or anticipated future effects by revegetation. Revegetation involves reseeding an archaeological site with plant ground cover for long-term management purposes. Generally the type of seed chosen for revegetation should be compatible with the local ecotypes, historic vegetation in the site area as appropriate, or a less destructive type of vegetation. Usually revegetation will consist of reseeding the site area with a grassy plant cover.

Revegetation methods may be initiated by spraying the archaeological site and surrounding area with a herbicide that will not be harmful to the site contents but will reduce weeds and encroaching vegetation. In some instances where plowzone disturbance is confirmed, disking of the ground surface may be appropriate to reduce weed cover. This is not recommended for mortuary sites and features or undisturbed sites.

Conventional drilling of plant seed to revegetate in previously disturbed sites would be more efficient. However, no-till drilling is recommended for burials or previously undisturbed site areas. Drilling of seed should be limited to 1-2 inches in undisturbed areas. Confirm appropriateness of procedures with the OSA and SHPO.

Periodic mowing or controlled burning may be necessary to maintain ongoing management of the revegetated site. If necessary, the local County Conservation Board may be able to provide assistance with regard to revegetation.

Conservation monitoring involves overseeing activities conducted at an archaeological site. Monitoring may occur by an individual or group as part of a site protection plan to watch out for vandalism, looting, or other damage at a protected site. Preservation commissions or local neighborhoods may take the opportunity to form a task group focused on this level of site protection.

Fencing entails demarcating an archaeological site area either temporarily during construction or more permanently. Fencing includes tape flagging, wire flagging, snow fence, wire fence, wooden fence, or other types of marking methods to clearly identify an archaeological area that should be protected. Permanent fencing should be clearly designated and maintained.

If determined feasible and more practical, the archaeological resource in question may be completely avoided by the proposed project and any proposed project construction activities to avoid adverse impacts. Avoidance only postpones the decisions concerning what should be done with the site. However, in some instances, when the resource is on private land, avoidance may be the only option for a project that does not have the capability to address future concerns, site management, or protection. Usually this type of activity will be detailed in an agreement document. However, short-term avoidance is not considered an effective treatment for the continued preservation of an archaeological site and is not considered an effective long-term protection strategy.

Alternative measures to ensure that previously determined significant archaeological resources will not be affected or impacted by a specific project and to protect it from future impact should be in a written agreement document. This written agreement will ensure the preservation of an archaeological resource under specific terms and obligates the parties to carry out its terms. If the terms cannot be carried out, the document should specify procedures to account for disagreements or be amended. (In no circumstance will the SHPO give a verbal agreement in consideration of protecting a cultural resource.) These written documents may be in the form of a mutual covenant, lease, State Preserve dedication, lease, management plan, letter of agreement, memorandum of agreement, or programmatic agreement.

Construction monitoring may also occur when project activities have the potential to affect a significant site. This type of monitoring does not ensure site protection but does ensure that if any significant remains are uncovered, they will be handled appropriately. In such a scenario, archaeological monitoring means observing the conduct of an excavation or construction project in order to recover archaeological information and materials if they are unearthed. However, monitoring is never an appropriate substitute for proper identification and consideration of archaeological sites during project planning,

For example, if construction will pass close to, but not actually through, an archaeological site, monitoring may be used to ensure that construction stays within specified limits, and that if any archaeological materials are encountered, proper procedures are followed. Monitoring may also be used at a site from which an excavated sample is being removed, to ensure that any significant features that may have been missed during the controlled excavation are salvaged and/or recorded. Finally, monitoring may be used where archaeological sites may occur but could not be dealt with in advance of construction because they were deeply buried or covered by buildings or structures that could not be removed. Monitoring under these circumstances is typically implemented as a condition of an executed agreement.

2.5.2. Data Recovery

Phase III data recovery is specifically designed to recover information contained in a significant archaeological site for research or before all or part of it is threatened in some manner. The goals of the Phase III Data Recovery/Impact Mitigation excavation focus on collecting knowledge and preserving cultural, environmental, and any other data of value from a site. Another important, but often overlooked, goal of data recovery is relevancy and public benefit. Public benefit and outreach should be considered an integral part of data recovery.

The data recovery should result in a full and complete report sufficiently detailed to permit independent evaluation of the investigation results. Data recovery results generally should be recorded in a manner that facilitates their incorporation into the historic property inventory maintained by the SHPO.

Archaeological documentation entails a series of actions applied to properties of archaeological interest. Documentation of such properties may occur at any or all levels of planning, identification, evaluation, or treatment. Each specific set of circumstances will dictate the nature and level of documentation used. Archaeological documentation consists of activities such as archival research, observation and recording of above-ground remains and observation (directly, through excavation, or indirectly, through remote sensing) of below-ground remains. Archaeological documentation is guided by a framework of objectives and methods derived from the planning process, and makes use of previous planning decisions, such as those on evaluation of significance.

2.5.3. Data Recovery Plan

Prior to conducting any field investigations, a Phase III Data Recovery Plan must be developed by or under the direct supervision of the Principal Investigator and submitted to the SHPO for review and comment. It may be applicable to extend Phase II investigations to provide sufficient data before a data recovery plan is developed to determine if additional Phase II investigations will be capable of determining a site's eligibility.

Every data recovery operation should be conducted in accordance with a Data Recovery Plan (often called a research design). The plan should be designed to ensure that the operation addresses legitimate research questions, that it produces useful results, that it is conducted efficiently, and that it produces the maximum direct and indirect benefit to the public for the least cost. Generally speaking, a data recovery plan should include the following elements: a statement of objectives; the reasons why the site was determined NRHP eligible and a statement of its significance within relevant historic contexts; specification of properties; development of research questions; establishment of study topics; establishment of study priorities; definition of data needs; and a description of methods and techniques of study.

Data recovery plans undertaken for compliance purposes or academic research upon an archaeological site should conform to the highest standards current in the disciplines pertinent to the resources involved at the time of the data recovery. A data recovery plan should provide for adequate personnel, facilities, and equipment to implement fully the data recovery plan. A data recovery plan should provide for adequate consultation with scholars and other experts including Tribal Historic Preservation Officers (THPO), whose research interests, traditional knowledge, or specialties would enable them to contribute to the plan.

Phase III investigations should be conducted by a qualified professional archaeologist in accordance with the SOI Professional Qualification Standards. The Principal Investigator should have sufficient expertise in project planning, field methods, conservation and curation of artifacts, and report preparation. Additionally, the Principal Investigator should demonstrate knowledge and expertise pertaining to the local and regional environmental setting and the relevant contexts of the archaeological sites to be investigated whether they are prehistoric or historical. It is the responsibility of the Principal Investigator and/or the sponsoring agency to ensure satisfactory completion of all archival research, field survey, excavation, recovery, data analysis, laboratory processing, conservation, curation, and reporting requirements. Project supervisory staff should also have training and experience in the specific context that applies to the project under investigation.

Data recovery plans should include specific procedures outlining what to do if there is an unanticipated discovery of human remains. The OSA Bioarchaeology program should be contacted for recommended language (see also Chapter 8.1).

Facilities and equipment should be capable of processing, analysis, and conservation of artifacts that have been recovered from the investigations. If necessary, special arrangements should be made with a capable facility for artifacts that cannot be processed, analyzed, or conserved at the designated facilities.

To the extent feasible, a data recovery plan should provide for public participation, through arrangements for public inspection of the work in progress, the use of volunteers, cooperation with local educational programs, etc. A data recovery plan should provide a means by which the public can be informed of the program and its results, before, during, and/or at the conclusion of the project. The data recovery plan should include a description of how the investigation will ultimately benefit the public and in what ways public outreach will be accomplished. Public benefit should continue after the project is completed and the report is written. Public benefit can include public participation during data recovery field work, lab work, or analysis. After analysis, public benefit and outreach could include not only the written report but other written, audio, or visual materials and presentations. Materials that distribute information learned from the data recovery to the general public should be presented in a format that is clear and understandable to a lay person.

Following is a recommended format for a Data Recovery Plan.

Title Page

This should provide essential information for immediate reference by reviewers and at a minimum should include: the identity of the site or district to be studied, identity of the Principal Investigator and organization that prepared the plan, the agency that requested it, the date of preparation, current address, contract number, and SHPO review and compliance number.

Introduction

This section should place the Data Recovery Plan in its temporal, spatial, organizational, legal, and administrative contexts.

Site Description

A concise description of the site, sites, or district to be investigated should be provided. This should not be lengthy, but should be sufficient to allow the reader to quickly understand the physical object of investigation and the context in which it exists. A detailed map should also be included with the description.

Major Research Question(s) to be Addressed

In this section, one or more research questions of stated significance in the social sciences, natural sciences, or humanities should be identified that the proposed data recovery would contribute significant information for research purposes. Ideally, these should be questions whose significance is phrased such that it is easy for the non-specialist to understand. The questions of stated significance should be related to the data or information gaps, research priorities, and historic contexts of the Statewide Historic Preservation Plan.

Specific Research Question(s) to be Addressed

This section should translate the major research question(s) into more specific terms that lead directly to the definition of information needs. It is not necessary that every possible research question be addressed, or addressed at the same level of detail. Priorities should be established.

Data Needs

This section should specify the data required in order to address the identified research question(s). It is necessary to obtain and analyze a substantial, representative sample of materials relevant to addressing the research questions.

Methods

Field and analytical methods proposed should be keyed to the data needs. The rationale for using any particular method should be clearly identified with reference to data needs. At the same time, sufficient flexibility should be maintained to permit effective handling of discoveries.

Phase III pre-field methods should follow all guidelines recommended for Phase I and II archaeological work in addition to any circumstances that specifically relate to Phase III investigations such as the appropriate use of heavy equipment.

Public Participation

If at all possible, the Data Recovery Plan should provide at least for the provision of information on the project to the public, and preferably for active participation by interested members of the public.

2.5.4. Implementing the Data Recovery Plan

Pre-field procedures should include any additional background research not accomplished during the Phase I and Phase II archaeological investigations. This includes conducting more detailed archival background research. Phase III investigations will most likely require more intensive and extensive background research, especially for historical sites. Background research should include a thorough document search of the National Register, state site records, previous investigations, county plat maps, county histories, ethnographic sources, land records, photographs, and other pertinent archaeological or historical sources that were not previously consulted.

Contact with landowners and local residents should occur prior to fieldwork in accordance with the procedures established for Phase I work. Full mitigation of adverse effects requires assurances that significant data produced by agency-sponsored data recovery will not be lost upon completion of the data recovery effort. Post-mitigation loss or destruction of artifacts and/or records is a reasonably foreseeable adverse effect. Transfer of property title as a condition of granting or condemning an easement, issuing a permit or license, or releasing funds is the preferred means of addressing this potential effect.

In Iowa, subsurface data recovery excavation strategies should be designed to be as complete as possible. Agencies and consultants should follow the Advisory Council on Historic Preservation's (ACHP's) *Treatment of Archeological Properties: A Handbook* (1980) for field methods in archaeological data recovery operations.

Regardless of the research topics being addressed, a data recovery program should employ methods that will ensure full, clear, and accurate descriptions of all field operations and observations. For example, excavation techniques, recording methods, stratigraphic and associational relationships, environmental relationships, and analytical techniques should be described, insofar as feasible, in such a way as to allow future researchers to reconstruct what was done, what was observed, and why.

To the extent feasible, the methods should take into account the possibility that future researchers will need to use the recovered data to address problems not recognized at the time the data was recovered. If portions or elements of the property under investigation can be preserved in place, the data recovery program should employ methods that will leave those portions or elements of the property in place. Destructive methods should not be applied to such portions or elements if nondestructive methods are practical.

To the extent feasible within the data recovery plan, data should be recorded in a manner compatible with those systems utilized by the SHPO, the OSA, and by state and federal agencies that store and utilize archaeological data. This consistency is very important to ensure that project results can have maximum applicability to future studies and planning efforts. The data recovery

program should include both field operations and post-fieldwork analysis sufficient to address the research topics.

Collection of artifacts and curation of specimens during Phase III data recovery should include all considerations previously discussed for Intensive Phase I survey guidelines. The SOI Standards for Curation and 36 CFR 79 should be consulted concerning the collection and curation of specimens. All artifacts, including fire-cracked rock, should be collected during data recovery. If possible all artifacts or specimens, diagnostic and non-diagnostic, should be collected and curated. However, the Principal Investigator in consultation with the SHPO and facility manager, should determine if collection and curation of all artifacts is plausible. A situation may dictate the collection and curation of only a representative sample of undiagnostic artifacts such as fire-cracked rock. Stratigraphic and horizontal control of collected materials should be implemented and maintained during Phase III data recovery.

Artifacts should be washed, labeled, cataloged, identified, tabulated, analyzed, and curated. Phase III data recovery should also include a broader range of collection strategies than Phase I or Phase II investigations that may include the collection of samples for flotation, floral analysis, faunal analysis, geomorphological research, chemical analysis, radiocarbon dating, or other forms of analysis. The samples of materials collected should be sufficient to address the questions detailed in the research design. Material samples should be collected and curated with the potential to have an application towards future research or to answer possible future research questions not currently posed.

The *Secretary of the Interior's Standards for Archeological Documentation Standards III and IV* (National Park Service 1983), should be consulted with regard to reports and data management. The final Phase III report should include all pertinent information outlined in the report guidelines chapter as well as the following items.

A summary of all investigations conducted at the site should be addressed in the report. Field methods, including sampling and screening methods, and laboratory/analytical methods should be thoroughly described in the report. The report should include sufficient and appropriate documentation of recovered materials. Where applicable, this information should include representative excavation unit and feature plan figures, soil profiles, test unit and feature profiles, artifact inventory tables, artifact drawings or photographs, etc.

The final report should also include a copy of the Data Recovery Plan and explanations or justifications of any deviations from the Data Recovery Plan.

In order for recovered data to be useful, the data used for description, analysis, and a basis for conclusions should be of sufficient detail and consistency to allow future researchers to arrive at similar conclusions, whether or not they agree. The report should include logical synthesis and interpretation of data recovered from the site and their importance in relation to the relevant historic context(s) established for the region and a discussion of contributions the Phase III investigations have made to the current state of knowledge of prehistory or history. Opinions should be expressed but clearly distinguished from the objective data and recommendations stated in the report.

Recommendations for additional analysis, other types of treatment for any portions of the archaeological resource that may remain intact, updating or revising research questions, goals, and preservation priorities should be addressed in the final report. If appropriate, recommendations for the conservation, short-term and long-term curation of the collection, and dissemination of information to the public resulting from the data recovery should be described.

Additional recommendations as a result of the data recovery project should be included in the final report. For example, if a management plan of the site is recommended, then an additional proposed management plan should be included.

Information on the location of the project data following the completion of the project should also be included in the final report.

If any of the archaeological site that has received data recovery operations still exists, a site management plan should be developed for the remaining portions of the site. A site management plan is a comprehensive program of action that details how an archaeological site will be treated and future considerations applied to the site after investigations are completed. The Site Management Plan should be written in a report format with supporting documentation and submitted to the SHPO for review prior to any construction activities.

Chapter 3. Geomorphological Guidelines

3.1. Introduction

Geoarchaeology is a discipline related to archaeology that is crucial to site identification of buried archaeological sites and the understanding of archaeological site formation processes. In Iowa, geomorphology is of particular concern because many intact and significant archaeological sites are buried beneath layers of sediments, some of which have only been deposited within the last hundred years or so. In certain instances, significant archaeological sites in Iowa are not evident from the surface and therefore cannot be identified through traditional archaeological surface investigations. They can only be located through subsurface testing, and to be cost-effective, testing should be undertaken with a thorough understanding of geomorphic, stratigraphic, and pedogenic processes.

Some form of geomorphological investigations and justification should accompany archaeological investigations in Iowa. As stated elsewhere in these guidelines, all investigation reports regardless of phase must describe the geomorphological context of the project area including the landform region it is located in, and the general geomorphology of the terrain within which the project area is located. For Phase I, II, and III investigations requiring subsurface investigation, the soils and stratigraphic contexts encountered must be understood by the Principal Investigator and field supervisors. If this expertise is not available, then the services of a professional geomorphologist meeting the qualifications discussed in these guidelines should be retained.

3.2. Considerations

3.2.1. Age and Landscape Position

Archaeological deposits are part of the universe of sedimentary deposits and, as such, have arrived at their present condition through a combination of cultural and natural processes. Interpretations of archaeological deposits are therefore dependent on assessment of their depositional environments. The stratigraphic situation of a project area should be considered to insure that the absence of archaeological deposits is not merely a reflection of poorly conceived or implemented archaeological field investigations.

In landscape positions where deposits older than 12,000 years are within one meter of the surface, an assessment of the presence or absence of archaeological deposits can be made using archaeological methods that may include a combination of surface survey and shallow subsurface testing as well as other techniques. Such landscape positions include: loess- and till-mantled uplands that do not contain areas of eolian sand and are typically at least 0.40 km distant from large valleys, areas shallow (<1m) to bedrock, elevated sandy-surface terraces where the depth to gravel is less than 1 meter, and valley slopes where glacial till, gravel, or bedrock is within 1 meter of the surface.

3.2.2. Depositional Complexity

The scope of appropriate geomorphological investigations varies according to inherent depositional complexity afforded at various parts of the landscape and by the defined study area (including horizontal extent, depth of impact, and indirect effects) for proposed projects. This is probably the most important issue addressed in these guidelines, yet it is also the most difficult to deal with on a project-by-project basis. For this reason, it is recommended that the level of geomorphological investigations and methods employed for a specific project area should be justified.

In complex geomorphological situations (such as large river valleys or project areas involving multiple landforms), the Principal Investigator should ensure that an appropriate level of geomorphological expertise is involved in the project. When the investigation is compliance-drive, it is often useful for consultants and agencies to meet with SHPO archaeologists regarding subsurface testing strategies prior to fieldwork. Questions concerning the involvement of a professional geomorphologist during an archaeological project can be addressed at that time.

3.2.3. Timing of Geomorphological Investigation

Geomorphological investigations, particularly those undertaken by a consulting specialist, should be conducted prior to archaeological fieldwork, so that information such as buried site potential, site landforms, and stratigraphy, can be taken into account in survey or excavation planning. On some projects, time constraints, a lack of depositional complexity, or other factors may make it more practical or efficient to have the archaeological and geomorphological investigations occur at the same time.

3.2.4. Historical, Urban, and Industrial Archaeology

For projects dealing with historical, urban, or industrial archaeological sites, a geomorphological assessment may not be applicable. This would be the case, for example, if the project's depth of impact is limited to historical fill that is unlikely to contain intact significant cultural deposits.

However, deep subsurface disturbance in urban and industrial settings cannot be assumed. Many Phase I surveys in such settings in Iowa have demonstrated that intact pre-development soils and sediments are very often preserved beneath and in between extant and non-extant structures and constructions. Many examples of the original topsoil preserved under construction fill have been documented, as have preserved, intact soil profiles in spaces separating developed areas. This cautionary statement is particularly applicable to areas mapped on soil surveys as "Urban Land." These soil mapping units are most often applied to areas where soil mappers could not detect from aerial photographs or existing knowledge what kind of soil types might exist beneath paved or in-filled areas. The same is sometimes true of areas mapped by the soil surveys as "Orthents." In general, conclusions that an Area of Potential Effect (APE) is "disturbed" often cannot be justified based on surface observations and soil maps alone, and a geomorphological assessment is necessary.

3.2.5. Depth of Impact

In most cases, the initial step in ascertaining how much geomorphological investigation is appropriate is to establish the depth of impact of the undertaking. Depth of impact comprises the vertical dimension of the Area of Potential Effect. For instance, if the depth of impact for a project will be 50 cm, perhaps minimal geomorphological research to that depth is all that is needed. Effects, such as compaction, of a project should also be assessed accordingly with regard to the appropriateness of the level of geomorphological investigation.

In complex depositional contexts, such as large stream valleys with thick overbank deposits, geomorphological investigation should exceed the depth of impact, because underlying, buried landforms, such as floodplain ridges and point bars may have influenced the microtopography of

more shallowly buried sites, creating for example, slightly higher, better drained, areas suitable for habitation within a surrounding wet, low-habitability landscape.

The agency's assessments of depth impact will aid in determining if a professional geomorphologist should be consulted. In many cases, the implementation of geomorphological knowledge and techniques by a knowledgeable archaeologist may be sufficient. Whether a specialist is consulted or not, the level of geomorphological investigations and methods employed for a specific project area should be justified according to the three-dimensional area of study.

3.3. Qualifications

3.3.1. Professional Geomorphologist

Under these guidelines, an individual must meet the following qualifications to be considered a professional geomorphologist for conducting geomorphological investigations in Iowa.

A qualified geomorphologist should have or be near completion of a post-graduate degree in an earth-science field (geology, physical geography, pedology, Quaternary studies) or a post-graduate degree in Anthropology or archaeology with a strong specialization in geoarchaeology, or demonstrated professional expertise in field geomorphology through experience and publications.

A qualified geomorphologist should have sufficient training and experience in the earth sciences to adequately evaluate the sedimentology, stratigraphy, and pedology of deposits in the field and be able to describe and analyze the deposits using standard terminology.

A qualified geomorphologist should have sufficient knowledge and experience of archaeological method and theory to understand the purpose of geoarchaeological investigations and of the archaeological context of sites and landscapes.

Previous fieldwork experience in the Upper Midwest is recommended to insure an adequate knowledge of regional stratigraphy, soils, and research issues.

3.3.2. Principal Investigators and Crew Chiefs

A professional geomorphologist may not be necessary on every archaeological project. It is the responsibility of archaeological consultants and Principal Investigators to determine when a project requires specialized knowledge beyond what archaeologists with specialized training acquire through training and experience.

Principal Investigators should have sufficient knowledge of geoarchaeology and Iowa geomorphology to develop an investigative strategy and methodology that adequately considers the geomorphological and geoarchaeological aspects of a project. Crew chiefs and field supervisors should also have a basic understanding of these topics. This is particularly important if the decision is made to proceed without the services of a professional geomorphologist.

3.4. Geomorphological Methods

Information gained in the field and through literature search is the foundation on which all interpretations and recommendations are based. This information also is a contribution to basic data that may have application to a broader range of topics and investigations. To allow for evaluation (review) and to be of use to the greatest number of other investigators, data should be gathered according to a set of standard practices and presented in a standardized format employing professionally recognized conventions and nomenclature. Certain information is essential for all investigations, while the need for other types of data is directed by the research questions addressed in specific projects.

Geomorphological investigation of the subsurface may involve several methods with various levels of effectiveness and destructiveness:

- Sediment cores: 1-3" diameter, manual soil probes or hydraulic coring. These provide quickly-obtained information to the depth that the tube can be pushed. Depending on the diameter of the sampler, and experience of the analyzer, fairly detailed geomorphological information can be obtained using this method.
 - Augers: greater than 3" diameter manual soil probes or hydraulic coring. Similar to above but disturbance of the sample is greater, and the amount of interpretation possible is less than with sediment cores. Impacts on archaeological deposits are similar to those of sediment cores. Large diameter augers, such as the bucket auger, may provide a sample size suitable for archaeological testing in addition to information on non-cultural deposits.
 - Test pits/excavations: excellent geomorphological information can be obtained from analysis of exposures made during archaeological testing. These can be directly related to the cultural deposits encountered. Typically such exposures are of limited depth and other geomorphological sampling techniques are needed to put these exposures into their stratigraphic context.
 - Backhoe trenches: excellent geomorphological information can also be obtained using this methodology. Backhoe trenches are more time-effective (and cost-effective) than manual excavations, but are poor for archaeological data recovery in the excavated area. A disadvantage to the use of mechanical equipment, such as a backhoe, is the potential negative impact to archaeological deposits. However, it is worth noting that the expediency and value of the information that can be recovered by mechanical equipment often outweighs the potential impact of the equipment use to a portion of a cultural deposit. **Still, it is always advisable to conduct mechanical excavation nearby, but off-site whenever possible to avoid damaging or destroying archaeological deposits. Mechanical excavation of any sort that will occur on site and has not been conditioned in an approved Research Design should always be discussed with the SHPO prior to commencing work.** Backhoe trenches have other disadvantages such as potential danger of collapse, and are not possible in some investigations where private landowners will not grant permission for their use. Although backhoe trenches provide a good view of deposits to depths usually greater than that available with manual excavations, there are many depositional settings in valleys where backhoe investigations cannot sample the entire depth that may contain cultural deposits. Such instances may occur as a result of a high water table or a great thickness of soil deposits. In such cases, other geomorphological sampling methods (coring or augers) should be employed.
 - Opportunistic examination and documentation of existing exposures, both natural (river cut banks, rodent holes, etc.) or artificial (road cuts, foundation excavations, etc.): these often provide excellent views of strata and are non-destructive in the sense that the profiles are already exposed and require only minor modification to yield information.
 - Geotechnical borings can be useful for a preliminary assessment of stratigraphy in the absence of information from the methods above. The bore logs describe strata texture, color, and consistence using a different descriptive terminology than the Natural Resources Conservation Service (NRCS) nomenclature used by archaeologists. Nevertheless, with practice, one can recognize major facies (overbank vs. channel deposits) that are of importance in evaluating buried site potential.
 - Various remote-sensing methods used to study the subsurface (resistivity surveys, ground-penetrating radar, etc.)—these are non-destructive methods that can rapidly scan an area (or transect) to various depths in order to detect "anomalies" in the transmission of electromagnetic or seismic energy through deposits. These methods vary in their effectiveness depending on local conditions (texture of deposits, water content, etc.) and rely on "ground truth" (physical examination of samples of the scanned deposits) for
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accurate interpretations of the scans. If such methods are used, adequate ground truth should be obtained in the investigated area during the field investigation.

Be advised that all of the subsurface testing techniques described above are subject to Occupational Safety and Health Administration (OSHA) regulations for excavation and trenching (29 CFR Part 1926 Subpart P).

Standardized terminology should be used in describing soils and sediments in order to make the information obtained during field investigations usable by a wide range of earth science professionals. If a different terminology or classification system is employed, then clear definitions must be provided along with definitions tying each term used back to its most closely related correlate. In Iowa, archaeologists use NRCS terminology, a full and frequently updated manual for which is published as *Field Book for the Description of Soils* (Schoeneberger et al. 2012). If a condensed or abbreviated version is used, the full bibliographic citation should be given in the project report.

All field descriptions should include horizon name, Munsell color, United States Department of Agriculture (USDA) textural class, redoximorphic features, inclusions, and boundary types. Structure should also be described unless not possible due to sampling methods (e.g., augering) or field conditions (e.g., water saturation). As complete a description as possible should be provided within given constraints of the describer's knowledge and field conditions. When present, sedimentary bedding resulting from high energy depositional conditions such as channels, point bars, and levees should be described in terms of variables such as bedding type and thickness. Each soil description should also identify its geomorphic formation and member associations.

A detailed description is not always necessary, but at least one detailed description should be made for representative soil types and depositional sequences encountered within the project area.

3.5. Investigation Phases and Geomorphology

Phase IA and Phase I geomorphological investigations are most often undertaken to evaluate the surface geomorphology and subsurface stratigraphy and soils of a project area. The purpose is usually to determine the potential for buried archaeological sites and to evaluate where and at what depth such sites, if present, are likely to occur. As such, the investigations take place on a landscape scale. In contrast, Phase II and Phase III geomorphological investigations are focused on the geomorphology and stratigraphy of specific archaeological sites, and are usually intended to contribute to the understanding of the depositional context, former landscape context, and site formation processes of the cultural deposits.

Especially in complex depositional sequences, a qualified geomorphologist is often retained to participate in pre-field planning, including writing the Phase III Data Recovery Plan. In the field, the geomorphologist can assist, through a preliminary program of landform mapping, coring, or trenching, and in selecting locations for excavations. Geomorphological expertise is also often required in describing and mapping excavation profiles. Phase II and III scopes of work sometimes call for sampling soil columns for purpose of textural, chemical, isotope, and micromorphological analysis, all of which often require geomorphological expertise.

If a professional geomorphologist is not to be involved in a Phase II or III investigation, proposals and reports should provide justification for the decision. This should include documentation that field supervisors include a competent geomorphologist as defined in these guidelines.

3.5.1. Geomorphological Phase IA Desktop Assessment

A geomorphological Phase IA is a desktop assessment requiring no fieldwork except perhaps a "windshield inspection" field visit to the project area. Subsurface testing is not undertaken, although existing records of previous subsurface borings or excavations may be consulted.

A thorough assessment will include mapping the geomorphic surfaces and landforms of the project area at a scale between 1:10,000 and 1:24,000. Map layers to be consulted include but are not limited to lidar; aerial photos; historic maps showing modern landscape changes such as channeling, draining, impoundment modifications; United States Geological Survey (USGS) topographic maps; and soil surveys. Additional sources might include STATEMAP surficial geologic maps, county geology surveys, field trip guidebooks, published articles, and technical reports from or near the project area.

The results of the Phase IA assessment should: 1) define and/or narrow the field of investigation by identifying where traditional archaeological survey methods will suffice to determine if archaeological deposits are present in the project area, and 2) determine if there are areas that will need deeper subsurface testing methods.

Because primary geomorphic surfaces of a project area (e.g., uplands, stream terraces, alluvial fans, abandoned channels) are topographically expressed, Iowa's statewide lidar hillshades and contours should be used as the primary dataset in mapping. Aerial imagery is also important because differences in vegetation and soil moisture create tonal contrasts that can assist in identifying changes in depositional environment that are sometimes not well-expressed topographically. NRCS soil survey maps are excellent for desktop assessment of the relative age and depositional environment of the project area, but a geomorphological map based exclusively on the classification of soil survey polygons is too generalized and therefore of limited value.

After the reconnaissance, the geomorphologist and Principal Investigator should devise a plan for assessing the potential for intact archaeological deposits in the project area in light of the known depositional context, physical parameters of the study area and depth of potential impacts. From the reconnaissance study, if parts of the study area are deemed to have potential for deeply buried archaeological deposits, they should be more thoroughly evaluated by the geomorphologist with the goal of determining the depositional context of the deposits, some details of their stratigraphy, mapping their extent (both surface and subsurface), and arriving at the age of the deposits either through relative or absolute dating.

3.5.2. Phase I Geomorphological Assessment

The purpose of a Phase I geomorphological investigation is to conduct a field investigation that identifies the location, depth, stratigraphy, and properties of soils and sediments with the potential to contain buried archaeological deposits. The purpose is not necessarily to find buried sites, but to acquire and interpret data that can be used in planning the Phase I archaeological survey. The geomorphological component of the Phase I is intended to help survey planners more effectively concentrate subsurface testing in areas where buried sites, if present, are likely to be found, and to avoid testing in areas where such sites are not likely to be present.

Phase I geomorphological fieldwork should be guided by desktop assessment resulting in a preliminary geomorphological map and an overview of existing knowledge of the project areas. This initial stage is identical to the Phase IA assessment discussed in the previous section, and is only conducted if a Phase IA has not already been conducted, or if modification or refinement of Phase IA results and recommendations are desired.

Assessing the potential of valley landscapes to contain buried archaeological deposits is one of the greatest challenges facing Phase I and Phase II archaeological investigations. Geomorphological evaluation of valleys should employ subsurface sampling extending to depths where deposits that are not likely to contain primary archaeological deposits exist. Sampling and analyses should be aimed at determining the origin and age of the deposits and strive to identify buried land surfaces. This information will enable archaeologists to devise effective subsurface testing plans.

Before the archaeological field studies begin, the geomorphologist and/or archaeologist should be provided clearly defined spatial parameters and the geomorphologist should undertake a field

reconnaissance study of the area. The purpose of the reconnaissance should be twofold: 1) to determine where traditional archaeological survey methods will suffice to determine if archaeological deposits are present in the project area, 2) to determine if there are areas that will need deeper subsurface testing methods.

Phase I fieldwork should gather data sufficient to identify the following:

- natural stratigraphy and distribution of the deposits, environment of deposition,
- age of the deposits (dated or inferred),
- presence or absence of buried stable surfaces (i.e., buried A horizons), and
- unconformities and missing time intervals.
- An attempt to date (using radiocarbon or other methods) natural deposits that serve as the framework for interpretation of the project's cultural resource potential is strongly encouraged.

There may be instances where it will be more efficient and cost effective to conduct standard archaeological investigations (even to 2-meter depths) as an initial project task rather than first arranging for and conducting geomorphological field investigations as a prelude to the necessary archaeological testing.

Valley landscapes may necessitate archaeological evaluation through a method such as auger testing at appropriate intervals to document the presence or absence of archaeological deposits. The documentation of this affirmative or negative data may be more important than establishing that a geomorphologic context exists that might possibly contain archaeological sites.

It is not always possible or feasible to have a professional geomorphologist involved in Phase I archaeological surveys. Therefore individuals conducting the Phase I archaeological survey should possess some knowledge of soil stratigraphy, soil texture, landforms, and be able to provide information on these subjects within the reports as outlined in the report preparation section (see Chapter 6.3). In some instances, depending on the project and the landform being studied, a Phase I survey may necessitate the involvement of a professional geomorphologist at an appropriate investigative level.

3.5.3. Phases II and III Geomorphological Investigations

In Phase II and III archaeological investigation the focus shifts from the spatial scale of the landscape to that of a site and its immediate vicinity and the purpose is to evaluate sites for NRHP eligibility (Phase II) or to recover data to mitigate adverse effects (Phase III). Geomorphological context is crucial to either goal, but the investigation typically emphasizes reconstructing the landscape surrounding the site at the time of its occupation and documenting the vertical and lateral extent of stratigraphic units within the site itself. Geomorphology can also have a critical role in determining the site's integrity, by documenting such processes as erosion and pedoturbation. Often, sites that reach these final phases of investigation have multiple components, and establishing the strata, depositional environment, rates of deposition, and integrity of individual components and living surfaces associated with each component is an important goal.

Chapter 4. Laboratory Guidelines

This Chapter describes recommended techniques and procedures for processing and curation of archaeological materials

4.1. Processing

Artifacts should be washed, labeled, cataloged, identified, tabulated, and analyzed. However, if any of these techniques will damage the artifact, then the use of the most appropriate processing

technique for that artifact should be employed. For example, it would not be appropriate to wash a piece of leather, cloth, or paper. Reconstruction of artifacts for display, documentation, or further research should employ adhesives that are non-permanent and reversible. All processing procedures should be conducted in a consistent manner. Processing of material should be mindful of research questions posed, appropriate to analyses, and should adhere to the research design.

4.2. Analysis

Analysis conducted should conform to the *Secretary of the Interior's Standards for Archeological Documentation* (National Park Service 1983) and accepted professional practices. It should be conducted in a consistent manner and substantiated with documentation from previous research or pertinent sources. Analyses must be consistent with the research design and conducted in a manner that will yield data necessary to address research questions.

4.3. Curation

It may not always be necessary to curate all archaeological materials recovered. It is the responsibility of the Principal Investigator in conjunction with responsible agency officials and the SHPO to make an informed decision on what materials should be curated, based on each site and its future research potential.

Artifacts recovered from federal or state owned or managed land belong to the agency that is responsible for management of that land. Artifacts recovered as a result of federally sponsored projects or projects that result from a federal undertaking should be retained in a stable environment according to the direction of the agency or as stipulated in an executed agreement or management plan until the Section 106 process is complete. It is the responsibility of the federal agency to determine the final disposition of collections obtained during an undertaking and to arrange curation.

Archaeology surveys conducted pursuant to federal requirements should comply with 36 CFR 79, *Curation of Federally Owned and Administered Archeological Collections* (National Park Service 1990b). Collections include the artifacts, maps, notes, film, and other materials pertaining to a regulatory project. These curation guidelines outline a sound approach to caring for archaeological collections, and the SHPO, the OSA, and the AIA promote their use in all projects. However, artifacts recovered from private land legally belong to the private landowner. A private landowner is not obligated to donate artifacts, or finance the curation and conservation of privately owned artifacts.

When artifacts are recovered from private property as a result of a federally sponsored project, arrangements should be made with the landowner prior to archaeological investigations for the agency to maintain control of the artifacts if possible. If the landowner wishes to retain the artifacts, they should be encouraged to allow the archaeologist sufficient time to document and analyze the artifacts and have them returned to the landowner after the project is complete. It is the federal agency's responsibility to insure that the archaeological consultant has adequate opportunity to conduct analyses and documentation in order to comply with the intent of federal law.

Standards for curatorial services for archaeological collections are provided in 36 CFR Part 79, *Curation of Federally-Owned and Administered Archeological Collections* (National Park Service 1990b). These standards are intended to ensure that federally owned and administered collections are deposited in repositories that have the capability to provide long-term curatorial services. By law, federal agencies are required to meet these standards in preserving collections of prehistoric and historic material remains and their associated records. As stated in 36 CFR 79, collections obtained from federal land or with federal funding are considered federal collections and must be curated according to the federal regulations. In some instances, if collections are from private property, they may be returned to the property owner. Under the *Native American Graves Protection and Repatriation Act (NAGPRA)*, there may also be cases where the collections must be returned to the Native American Indian tribe (Department of the Interior 1995).

All artifacts and associated project records should be curated permanently at a facility in the State of Iowa that meets standards for curation established by the Secretary of the Interior (36 CFR 79). The Register of Professional Archaeologists (RPA) also has lengthy standards for curation facilities that should be referenced. According to the *Secretary of the Interior's Guidelines for Archeological Documentation* (National Park Service 1983), satisfactory curation occurs when:

- curation facilities have adequate space, facilities, and professional personnel;
- archaeological specimens are maintained so that their informational values are not lost through deterioration, and records are maintained to a professional archival standard;
- curated collections are accessible to qualified researchers within a reasonable time of having been requested; and
- cultural material and the project records are curated at the same facility.

Curation arrangements, including information about the location of the collection, should be detailed in the project report. Preliminary curation may occur after processing and analysis of the collections. This may occur during or after the field methods have been completed. Final curation should be accomplished in a curation facility in Iowa when all fieldwork, processing, analysis, and the final report have been completed.

4.3.1. State Archaeological Repository

The OSA maintains the State Archaeological Repository, a facility that meets the federal curation guidelines. Fees are subject to change based on annual budgetary needs. Contact the University of Iowa—Office of the State Archaeologist for the current fee schedule (<https://archaeology.uiowa.edu/services-and-fees>). If collections are to be curated at that facility, a "Material Submittal Form" must be completed.

4.3.2. Other Repositories

Other repositories in the State may also meet the federal curation standards. Please check with the other repositories to ascertain accreditation, processing requirements and fee schedules. In regulatory archaeology (Section 106) cases, curation normally should occur immediately after the consultation process between the SHPO/THPO and the agency is concluded. Until curation occurs, all project records and artifacts should be available for inspection by the agency and the SHPO/THPO.

4.3.3. Return of Artifacts to Landowners

In cases where landowners request or require the return of artifacts, the artifacts should be returned only after the agency sponsoring the work and the SHPO have completed their review of the project report. Artifacts may not be turned over to a client or project sponsor who is not the owner of the real property from which the materials were recovered. Under certain circumstances, especially when a report does not include all pertinent details, the documentation of field methods and results should be curated even if no artifacts are submitted for a project. If artifacts are returned to the landowner rather than curated, all remaining documentation concerning the collection should be curated in an appropriate repository in accordance with the *Secretary of the Interior's Standards for Archeological Documentation* and 36 CFR 79. Examples of such documentation include: an itemized list including catalog numbers of all artifacts; the analysis forms for the collection with standard items such as measurements, descriptions, and line drawings; photographs of all culturally- and/or temporally-diagnostic artifacts; and any other ancillary documents associated with the research or phases of data recovery.

Chapter 5. Reporting Guidelines

This chapter describes best practices for report preparation and the appropriate levels of information that should be documented for archaeological survey or evaluation. There are three kinds of reports:

- Full reports are the most common type, required for most phases of archaeological investigation that result in the identification, evaluation, or mitigation of archaeological historic properties.
- Letters are often used to convey the results of work that is supplemental to the initial, larger scale investigation report. Examples include a supplemental Phase I or Phase IA survey undertaken because of changes in project location or design. Specialist studies (e.g., geomorphology, faunal analysis) undertaken by sub-consultants are often conveyed to the prime archaeological contractor in a letter, if brief. Although the body of a letter may be brief, the letter should nonetheless include maps, tables, and other documentation appropriate to thoroughly document project location, landform context, and results. Letters are not accepted as final reports, but are meant to only be interim in nature.

The legitimate use of letter reports fall into two categories: 1. as the product of a desktop assessment; and 2. as an interim device for updating the progress of field and lab work, field conditions, discoveries and consequent modifications to field strategy and research design, changing project circumstances, etc., typically in data recovery situations. Use for the latter must be stipulated in a formal agreement among consulting parties and conditioned upon the ultimate completion and delivery of a formal report. Letter reports are not recommended as a substitute for formal or ASSR final reporting formats resulting from Phase IA reconnaissance survey or Phase I/Phase II intensive investigations. Letter reports will not be entered into the NADB database or on I-Sites under use in such circumstances.

- Archaeological Survey Short Reports (ASSRs) may be submitted in lieu of a formal report to document negative findings only when the following criteria apply:
 1. Field investigations are negative. No sites, structures, bridges, cultural landscapes, or objects of archaeological or historic significance are identified within or immediately adjacent (100 feet) to survey area.
 2. The survey area is less than 20 acres in size.
 3. Bridge replacement projects in which the bridge to be replaced has been previously evaluated as ineligible and SHPO has concurred, and criteria 1 and 2 apply.

A single ASSR form cannot be used to report survey results in noncontiguous survey areas that fall in separate geographical (PLSS) sections, that are not part of the same project, or that are subject to separate and unrelated jurisdictions. Under those circumstances, separate ASSRs must be completed for each of the areas surveyed.

ASSRs must be signed and dated by the Principal Investigator at the time they are sent to the SHPO for review or they will not be accepted. Contact the SHPO if you have questions regarding the proper use of the ASSR.

Digital copies of the ASSR form and the instruction manual are available for download. See: <https://iowaculture.gov/history/preservation/resources/forms-and-instructions>.

5.1. Full Archaeological Report Format

Information to provide in an Archaeological Report includes the following, in a suggested order of presentation.

5.1.1. Title Page.

The title page typically should include the following information:

- Report title including:
 - Confidentiality statement
 - Type of archaeological investigation (Phase IA, I, II, III, etc.).
 - General location (e.g., County, City, Township, Range, Section Number)
- Authors
- Date of report
- Agency or other entity contracting for or otherwise sponsoring the investigation
- Name and address of firm or organization conducting the study
- Name of the principal investigator
- Contract and/or permit number, if applicable
- SHPO Review and Compliance number if available

Title Pages may be omitted in letter reports. However, the letter report should be on company/agency/organization letterhead and the preceding information provided.

5.1.2. Table of Contents.

Table of Contents should also include a list of figures and tables where applicable.

5.1.3. Acknowledgements (optional)

Acknowledgements may be added if desired. Acknowledgements recognize contributions of other individuals who helped with any aspect of the project.

5.1.4. Abstract.

The abstract may consist of a paragraph or a separate page at the beginning of the report. A brief summary of the project, the number of acres surveyed, dates of survey, and survey results and recommendations should be included in the abstract. The abstract identifies the undertaking, type of project, and purpose of study; summarizes the report's contents, and identifies archaeological sites investigated and their significance.

5.1.5. Introduction.

An introduction to the report presents information that will give the reader a clear understanding of the purpose of the archaeological study. The introduction should include:

- Confidentiality statement, as follows:

“Information contained in this report relating to the nature and location of archaeological sites is considered private and confidential and not for public disclosure in accordance with Section 304 of the National Historic Preservation Act (54 U.S.C. § 307103); 36 CFR Part 800.6 (a)(5) of the Advisory Council on Historic Preservation’s rules implementing Sections 106 and 110 of the Act; Section 9(a) of the Archaeological Resource Protection Act (54 U.S.C. § 100707) and, Chapter 22.7, subsection 20 of the Iowa Code.”
 - Description of the proposed undertaking and sponsor.
 - Purpose of the study and scope of work.
 - Location of the proposed project area, and, if different, of the surveyed area. This information should always be presented with reference to Township, Range, Section, and if possible, to the Universal Transverse Mercator (UTM) Grid System.
-

- Map(s) showing exact location and boundaries of the project area and/or surveyed area. Any areas not surveyed within the demarcated project and/or surveyed area should be clearly identified on the map. At least one map should locate the project area and/or the surveyed area on a current aerial photo, LiDAR hillshade, or other base layer that accurately depicts the project in relation to its current environs. The use of USGS 7.5 minute quadrangle maps (1:24,000 scale) as project location maps is strongly encouraged.
- A clear statement regarding the number of hectares and acres in the project area and the number of hectares and acres surveyed. Linear distances (miles, kilometers) are helpful for corridor studies, but areas must be reported also.
- Dates of survey, subsequent investigations.
- Personnel involved in project.
- Time expended in the field.
- Disposition and curation of field notes, artifacts, and other records generated by the project (e.g., photos, analysis, catalogs, etc.).

5.1.6. Environmental Context.

The environmental context should describe appropriate aspects of the project area's surroundings. It should give the reader a clear picture of the physiography, flora, fauna, and other objects or conditions encountered.

The environmental context should include:

- Description of regional physiography, geology, soils, environmental and geologic history (as it relates to interpretation of the context of cultural deposits) as determined from review of the literature.
- Relevant land-use history (e.g., human-induced land disturbances, other surface alterations).
- Current conditions within the project area (e.g., type of ground cover, surface visibility).

5.1.7. Geomorphological Context

The geomorphological context should include more specific descriptions of the soils, landforms, and surficial geology of the project area and vicinity.

- Introduction with the location of the project area in regard to Prior's (1991) landform regions.
- Descriptions of relevant geomorphic formations and members using recognized nomenclature or terms that are cross-referenced with recognized correlates.
- Physiography, regional geology and with dates of geomorphological field investigation, if any.
- Background research including a description of regional physiography, geology, soils, environmental and geologic history (as it relates to interpretation of the context of cultural deposits) as determined from review of the literature.

The following sections may be included in this section, or incorporated into subsequent sections of the report.

- Methods section that describes the field methods (this may also be included in the overall methods section).
 - Results in relation to the archaeological deposits in the project area. This should also include an interpretation of the results in light of the potential of the area (from the
-

viewpoint of age and depositional environment) to contain archaeological deposits. All detailed descriptions, profiles, cross-sections, photos, and laboratory data not presented in the text, as well as reports of radiocarbon or other absolute dates should be contained in an appendix.

- Summary of the results and recommendations.

5.1.8. Historical/Cultural Context.

The historical/cultural context should include more specific descriptions of the cultural periods or specific groups that may be or are represented within the project area. This section should also mention any previous contexts that have been developed for areas adjacent to the project area.

- Previously recorded archaeological sites and previous archaeological investigations.
- A narrative of historical development of area and sites.
- Potential historic archaeological sites, relating data to relevant land-use history.
- Relevant information from informants, when used. Informants should be identified and cited.
- Historical/Cultural contexts relevant to the investigation.
- Relationship of previously recorded data to established prehistoric and/or historic cultural contexts.

5.1.9. Methods

The methods section should describe the particular methods employed and explain the reasoning for methods used or not used. Methods employed should be relevant to the research questions posed in the research design and should be applied in such a manner that the results can be duplicated independently. This section of the report should include:

- Pedestrian surface survey techniques (e.g., piece-plotting, gridded controlled surface collection, transect samples) and intervals.
 - Subsurface testing techniques, including:
 - Type(s) of subsurface tests (e.g., bucket-auger, solid-core, shovel test, etc.).
 - Method(s) of excavation (e.g., coring, troweling, shoveling, and screening) and vertical increments utilized (e.g., 10-cm levels).
 - Methods of treatment for significant sites or data recovery.
 - Sizes of subsurface tests (1 m x 1 m, 50 cm x 75 cm, etc.).
 - Ending depths of tests.
 - Location of tests, provided on a detailed project area map. These test locations should be labeled on the maps and in the text by appropriate identification references (e.g., numeric, alphabetic, or both).
 - A statement of justification for no subsurface testing, if applicable.
 - Material collection techniques (e.g., total surface pickup, controlled collection, grab sample).
 - Methods of processing, analysis, and curation.
 - Constraints on the validity of observations and conclusions (e.g., no access on private lands, adverse weather conditions, potential biasing factors in data collection or analysis).
 - Justification of methods employed, especially the inclusion of an explicit statement explaining why subsurface testing was not conducted (if this was the case).
-

5.1.10. Constraints to Investigation and Deviation from Guidelines

The Guidelines are intended to be flexible and accommodating to project needs and research-specific objectives. At the same time, it is the responsibility of the principal investigator to document all seen and unforeseen research limitations and to justify any deviation from the Guidelines best practices. This also applies to limitations upon and deviations from a data recovery plan prepared under a formal agreement.

5.1.11. Results

The results section should discuss the results derived from all aspects of the investigations including areas where no sites were found to document the geomorphological conditions encountered.

All archaeological sites found in the survey area, identified by their official Iowa Site File (OSA) number. The SHPO will not accept reports that identify or evaluate archaeological sites in the project area that have not been assigned official site numbers.

- Descriptions of all sites, located in reference to Township, Range, Section, and UTM, and in relation to the project area.
- The size of the site(s) (e.g., acres, hectares, meters squared) and the portion(s) of each site located within the Area of Potential Effect should be indicated in the text and the site boundaries should be clearly demarcated on a detailed map. If the site extends beyond the Area of Potential Effect, a reasonable attempt should be made to determine the size of the site and site limits if possible.
- The current conditions at the site(s) need to be discussed. Any extant buildings or ruins of structures at the site need to be mentioned. Photographs of the buildings and ruins should be provided and their locations should be provided on a detailed map of the site.
- The locations of any observed archaeological features at the site need to be mentioned and their locations should be provided on a detailed map of the site.
- The results must be used in such a way as to address research questions posed in the research design or data recovery plan.

5.1.12. Management Recommendations.

Management recommendations should discuss and explain the reasoning for all conclusions and recommendations addressed. This section of the report should include one or more of the following recommendations:

- If no sites were identified during the study, and if coverage was thorough, no further archaeological work should be recommended.
 - If no NRHP listed or eligible sites were found, this should be clearly stated and, if fully justified, no further archaeological work recommended at those sites, assuming criteria A, B, C, and D, have been considered.
 - If NRHP eligibility cannot be determined from this study, recommendations for additional survey, testing, archival research, geomorphological assessment, or other types of investigation must be stated along with rationales for each recommendation.
 - If additional investigations are needed, types and recommended scopes of such studies should be outlined.
 - See 5.1.13 on Tables.
 - Include recommendations for preservation/protection and site interpretation.
-

5.1.13. References.

Bibliographic references should be complete and must include a citation for the most recent version of the AIA's *Guidelines for Archaeological Investigation in Iowa*.

The recommended style guide is: American Antiquity, www.saa.org/Portals/0/SAA/Publications/StyleGuide/StyleGuide_Final_813.pdf. Parenthetical citations should reference specific page numbers where relevant.

5.1.14. Tables

Tables may be placed in the body of the report following the first in-text citation of each, or can be placed following the references cited. Tables should include the following information where appropriate:

- All collected artifacts, inventoried in tables or appendices.
- A table summarizing data for all sites should be prepared for investigations involving five or more archaeological sites.
 - Official site number
 - Landform
 - Cultural affiliation(s)
 - National Register eligibility status
 - Recommendations
 - Other relevant information

5.1.15. Figures

Figures including maps, drawings, photographs, etc. should include the following information where appropriate:

- Figures showing exact archaeological site locations must include confidentiality callout “**Not for public disclosure.**”
- A detailed map or maps of the project area showing all surveyed areas and the specific locations and types of all individual subsurface tests along with their assigned field numbers.
- A detailed map or maps of the project area that show the locations of all archaeological sites, structures, foundations, and other cultural features.
- Pertinent historic maps, soil maps, geological maps, and geomorphological maps and diagrams.
- Map(s) showing exact location of the project area and/or surveyed area with the current conditions (e.g., type of ground cover, surface visibility) for multiple ground coverages within the project area clearly demarcated.
- Site overview photographs taken at the time of survey with orientation and other relevant information noted in the caption.
- For geomorphological investigations, the report should contain a map showing the geology of the area (USGS 7.5 minute quadrangle map or more detailed) as deduced from the investigations, cross-sections of deposits, location of data points, descriptions of representative deposits, and photographs of soil profiles or columns with strata identified.

Figures may be placed in body of text or following the references cited section.

5.1.16. Appendices

All reports, regardless of phase, should include a completed National Archeological Database (NADB) form for archaeological investigations. NADB forms should be completed for all levels of archaeological research and for separate geomorphological reports of investigations in conjunction with archaeological research. If archaeological sites are recorded or revisited as part of a project, Iowa Archaeological Site Forms must be completed.

Appendices may also include any other pertinent information that is relevant to the comprehension of the report or required by the specific contract. Examples might include:

- Detailed maps or data tables requiring too many pages for placement in the body of the report.
- Scopes of work.
- Project correspondence.

Chapter 6. Iowa Site File Guidelines

The Iowa Site File (ISF) is a database and Geographic Information System (GIS) maintained by the University of Iowa – Office of the State Archaeologist (OSA) containing the site information for all reported archaeological sites in Iowa. Use of the ISF, and contribution of data to this database generated through field or archival investigations, is a foundational aspect of conducting informed and meaningful project research. Only a fraction of the archaeological resources in Iowa are recorded in the ISF but these represent the known starting place from which project consultation and field investigations must begin. Project Principal Investigators are responsible for insuring that supplemental data for previously recorded sites as well as data for newly discovered archaeological resources are provided to OSA for addition to the ISF.

Site location information is confidential according to Chapter 22.7(20) of the Iowa Code. Site information is available from the OSA Site Records Manager through a Site File Search or via online access.

The ISF defines an archaeological **site** as a location yielding evidence of human occupation or activity older than 50 years in age, excluding modern trash and incidentally spread historic rubbish. This may include sites comprised of a single artifact such as a chipped stone tool or may be as large as an entire farmstead or village location. Locations with standing structures are only included as part of a site if they have an archaeological component. Linear features such as road or railroad grades, mill races, or levees fall more within the realm of architectural or engineering features. However, there are instances in which archaeological components may be involved. Questions about defining archaeological sites should be directed to the OSA Site Records Manager

6.1. Data Entry of Site Information

When an archaeological site is defined, a site number must be acquired and the corresponding data entered into the ISF. Site numbers are requested, and form information is submitted online through the I-Sites web interface. An I-Sites license is not necessary for number checkout or site information submission.

Maps accurately depicting site boundaries are required to complete ISF form submittal. Paper (print) maps are not accepted from professional archaeologists who must submit GIS shapefiles. All sites smaller in area than a 10 m radius circle are to be digitized as a 10 m radius circle, and listed as a “dot” in the ISF shapefile. Uncertain locations and boundaries are to be digitized as “triangle” sites. A complete list of the GIS shapes in use by the ISF is available from the OSA Site Records Manager.

Nonprofessionals may submit maps in digital formats including pdf, jpg, gif, or png. Paper maps are discouraged.

Site forms and shapefiles should be submitted within six months of discovery, ideally sooner, regardless of status of the research. Data can be added later using the supplemental site form submittal. Failure to complete timely submission of site data may lead to revocation of site number checkout privileges. The OSA reserves the right to refuse substandard forms, shapefiles, and maps. If you have any questions on your form or shapefile/map submittal, please contact the OSA Site Records Manager.

A supplemental site form may be submitted any time after an original form is submitted for the recording of a site. It can report any changes or new information acquired about the site since the submission of the original form. This may or may not include a revised map location. If boundaries of the site have not changed, a new shapefile/map is not required.

Forms can be printed from I-Sites for inclusion in reports.

6.2. Confidentiality and the ISF

The ISF contains site location information considered confidential according to Chapter 22.7(20) of the Iowa Code and use of these data is at the discretion of the State Archaeologist. Generally, qualified archaeologists will be granted access to ISF information. A qualified archaeologist is one who meets the *Secretary of the Interior's Professional Qualifications Standards for Archeology* (National Park Service 1983). A qualified archaeologist may also supervise ISF access by support staff working directly under their guidance. All other ISF access is on a situational basis determined by the State Archaeologist.

All site records acquired from the ISF including digital or printed site location maps and forms are considered an extension of the ISF, and the Iowa Code confidentiality restrictions are extended to these data. Unauthorized distribution of this information without the express permission of the State Archaeologist is prohibited. Archaeologists who have ISF access are required to maintain the confidentiality of the site file. If you have any questions about data distribution please contact the OSA Site Records Manager.

6.3. On-line ISF Access

Qualified archaeologists can acquire a license to access the online ISF, I-SitesPro. The yearly license runs from July 1 to June 30 (state fiscal year). The fee structure is available on the OSA website. This service provides web-based GIS access to the ISF database, the SHPO NADB database, the SHPO site evaluation database, the on-line I-Sites GIS, and scanned original site forms. ArcGIS users can also obtain access to GIS layers through a web map service (WMS). For more information on this service, contact the OSA Site Records Manager.

6.4. Other ISF Services

A Site File Search may be requested directly from the OSA Site Records Manager on a fee-for-service basis. The current search fee can be found on the OSA website and the request form can be downloaded. Search requests must be accompanied by a clear map (USGS 7.5 minute quadrangle map preferred), with the project area outlined and labeled. A shapefile may also accompany the search form but a map as described must also be provided. Digital submittals are preferred; send to the OSA Site Records Manager via email: Colleen-Eck@uiowa.edu. Most searches are completed within three business days of receipt. You may contact the OSA Site Records Manager if you have questions or special considerations for a project.

I-SitesGov is an online GIS subscription service, including for mobile devices, which provides limited archaeological site information to government agencies and other organizations involved in planning, but lacking a qualified archaeologist on staff. I-SitesGov provides quarter-section site

location data as well as survey coverage information. This service is available for a yearly fee; see the OSA website for details. Using the I-SitesGov interface is not a substitute for a formal Iowa Site File Search, but rather is a planning tool that helps position projects away from known archaeological sites but in locations where previous archaeological survey data are available, which may reduce the need for additional archaeological investigation. However, it is well to remember that just because an area has been previously surveyed it does not necessarily mean that the previous investigation was performed using today's best-recommended practices, achieved accurate results, or will meet present needs.

Chapter 7. Public Outreach

The AIA recognizes and endorses the ethical principle that archaeological investigations are in the public interest and that as most funding for archaeology stems from public sources it is imperative that information generated from archaeological research is widely shared through a broad spectrum of public-friendly venues. Compliance legislation such as the National Historic Preservation Act includes requirements for broad dissemination of project results to the public. In addition, many grant sources, especially federal, for archaeological projects also increasingly emphasize broader aspects of archaeological projects on the public. Engaging with the public is rapidly developing as an applied subfield within archaeology, moving toward formalized professional best practices and skill sets. Iowa has a long and distinguished history of archaeological outreach and education that is nationally recognized and modeled. The AIA recommends education and outreach initiatives in Iowa should aim to foster an appreciation for Iowa's prehistoric and historic past, encourage a conservation ethic, and promote the understanding of the discipline of archaeology while finding ways to make archaeological research and investigations relevant to the modern world.

Archaeological projects should strive to include public outreach goals which:

- Reflect the depth and richness of the human experience.
- Support the awareness and respect for one's own cultural past and present.
- Support awareness and respect for other cultures.
- Develop knowledge and interest about past cultures.
- Encourage stewardship of archaeological resources.
- Develop greater understanding and appreciation of archaeology, archaeological methods, and their applications.
- Identify misconceptions and offer new interpretations.
- Apply new archaeological insights to contemporary situations.
- Provide an educational return for public financial support.

Various creative methods should be explored to convey archaeological information and interpretation to the public. A few examples of effective communication methods are listed below:

- Published material (public reports, brochures, pamphlets, curricula)
- Exhibits (permanent and traveling)
- Educational kiosks and signage
- Various media (TV, radio, video, social media, and internet including web sites, pod casts, blogs)
- Presentations (lectures, conferences, local speeches, demonstrations)
- Youth organizations
- Participation in Iowa Archaeology Month events

It is imperative in some situations to withhold specific information such as site location for protection of the archaeological resource. In Iowa, the Office of the State Archaeologist also has

specific policies on releasing certain kinds of information pertaining to archaeological resources [see Iowa Code Chapter 22.7(20)].

7.1. Public Collaboration

Public collaboration in archaeology creates ways for non-professionals to be involved in academic or contract-related archaeology projects and creates an interactive environment between professionals and non-professionals. In these situations, an agency or organization sponsoring an archaeological project does more than just provide information to the public. They provide continued community involvement through various levels of archaeological experience under the direct supervision of a professional archaeologist. Public collaboration in archaeology accomplishes many of the goals identified for public outreach. Collaboration benefits both the public and the agency or organization that sponsors the project. The public benefits by increased awareness and appreciation for the environment and human history, increased knowledge about the cultural resource and historic preservation, a sense of accomplishment, and community cohesiveness. The agency benefits by potentially decreasing project costs, and creating awareness, and potentially appreciation, for public-supported and financed undertakings. Agencies may be able to meet their legally-mandated responsibilities for education and outreach to the public through collaborative efforts, although it is recognized that liability concerns may limit direct public involvement in some field activities.

Volunteers may include non-professionals (students, avocational archaeologists, and other interested individuals) that would assist with an archaeological project. Volunteer assistance should be determined at the discretion of the agency or organization sponsoring the archaeological project. In certain circumstances, volunteer assistance with a project can reduce project costs, increase project results, and benefit the public through education. Volunteers should be supervised at all times by a qualified professional archaeologist.

The Iowa Archeological Society (IAS) is a non-profit organization open to any individual interested in preserving and studying Iowa's prehistoric and early historic heritage. The IAS, in cooperation with the OSA, offers a certification for avocational archaeologists. The Iowa Archaeological Certification Program is designed to train individuals to assist professional archaeologists in field and laboratory work.

7.2. Public Education

Archaeology is both interdisciplinary and humanistic. It utilizes science and scientific processes to recover information relevant to social studies. Archaeological inquiry fosters understanding of past and present cultures, has the potential to address science, math, social studies, and literacy education, and enhance citizenship education to help preserve the archaeological legacy. Archaeologists have increasingly made their discipline relevant to the world of both formal and informal educators.

Formal (classroom) educators in the twenty-first century are more likely to incorporate archaeology into their curriculum if it assists in meeting mandated standards and benchmarks established by local school districts or those set at the state or national level. Iowa's Core Curriculum (or see, Common Core State Standards), signed into law in 2008, provides local school districts and nonpublic schools a guide to delivering instruction based on consistent, challenging and meaningful content to students. It identifies the essential concepts and skill sets for literacy, mathematics, science and social studies, as well as 21st century learning skills (civic literacy, financial literacy, technology literacy, health literacy, and employability skills).

Archaeology is tailor-made to address these concepts and skill sets. Archaeological lessons and activities can engage students in the basics of scientific inquiry (observation, inference, evidence, and classification) using authentic primary sources and inquiry-based learning. The same lessons and activities can demonstrate scientific methodologies as applied to the analysis of artifacts and

structural features including spatial reasoning, material source analysis, soil chemistry, paleobotany and paleozoology. They also incorporate twenty-first century technologies including GPS, lidar and GIS, and strengthen computer literacy. Finally, they allow students to explore the ethics of scientific research on past cultures and peoples and engage in civic dialogue about topics such as site stewardship. Archaeology is also the primary source for content information about human prehistory and an important primary source for historic era studies.

Informal educators including museum educators, naturalists, and interpreters are interested in archaeological interpretations that demonstrate the ways in which prehistoric and historic peoples met basic human needs, interacted with the natural environment, utilized natural resources, and created a variety of technologies. Among the perceived needs of many of these educators is information on the diverse American Indian cultures that have inhabited the region prehistorically and historically, the contributions they have made to our modern world, and the nature of archaeological research and its role in providing this information. Informal educators also strive to compare and contrast the past and present through the study of the material cultural record and utilize collections to meet specific interpretive and educational purposes.

Recommended professional qualifications for those involved with planning public archaeology events and programming include the following although the AIA recognizes there are many responsible collectors, teachers, and students who may not have all these qualifications but who nonetheless are valuable partners in engaging the public in archaeology:

- an advanced degree in anthropology with specialization in archaeology;
- in-depth knowledge of regional archaeology;
- familiarity with the American system of K-12 education including basic understanding of principles of education, curriculum development, standards, and benchmarks;
- experience creating museum exhibits;
- experience in leading hands-on workshops, or in authoring or designing general-interest or educational publications;
- competency in archaeological interpretation;
- demonstrated verbal communication and writing skills; and
- demonstrated ability to positively and effectively interact with a variety of publics.

Chapter 8. Specialist Studies

8.1 Human Remains

8.1.1. Treatment of Mounds and Sites Containing Ancient Human Remains

This chapter describes the field procedures and treatment of mounds and deposits containing ancient human remains. It recommends techniques and procedures for conducting archaeological investigations of any mound, potential mound, or other type of deposit with the potential to contain human remains.

The State of Iowa is committed to preserving and protecting ancient human remains. The University of Iowa – Office of the State Archaeologist (OSA) is the appropriate agency to contact regarding the discovery of human physical remains or suspected human physical remains believed to be greater than 150 years in age (a.k.a. “ancient”). The OSA should be notified of the location of areas believed to represent ancient burial grounds. The State Archaeologist has the authority to deny permission to disinter human remains over 150 years in age from ossuaries, grave sites, cemeteries, or any other deposit [Iowa Code, Sections 263B and 716.5; Iowa Administrative Code

[IAC) 685, Ch.11.1]. The following field procedures will be implemented during the archaeological evaluation of a project area to identify these deposits and to inform the appropriate officials of their presence. The OSA Bioarchaeology Program will be provided with and approve any recommendations concerning ancient human remains prior to completion of final project reports. Native American human remains encountered on federal property are subject to the requirements of the Native American Graves Protection and Repatriation Act, or NAGPRA (43 CFR 10 and *Federal Register* Vol. 60, No. 232, December 4, 1995; Subpart B §10.3–10.7) and the Archeological Resource Protection Act (P.L. 104-333; 16. U.S.C. 470aa -- mm) regardless of the age of the remains. Projects resulting in the discovery of *ancient* human remains from any context must, by Iowa Code, turn these remains over to the OSA and therefore NAGPRA regulations will apply because OSA is part of an institution which receives federal funds. Projects on non-federal or non-tribal lands resulting in the discovery of human remains determined not to be ancient as defined in the Iowa Code may be subject to NAGPRA if the remains are claimed by a tribe and determined to be Native American; in such cases OSA can assist with NAGPRA compliance.

8.1.1.1. Previously Known Sites Yielding Human Remains

A site records check of previously known archaeological sites within the immediate vicinity of each proposed project or survey area should be conducted prior to field inspection. If a previously recorded site or project area from which ancient human remains were previously recovered or reported is indicated, the archaeologist will inform the Bioarchaeology Program, Office of the State Archaeologist [(319) 384-0740; 384-0732] of the location with respect to the proposed project prior to the start of fieldwork. A “burial site” includes those sites where site type is listed as mound(s), possible mound(s), isolated burial(s), historic/prehistoric cemetery, or any other term suggestive of a burial site or possible burial site, or where the site records indicate human remains have been found in the past.

Initial Bioarchaeology Program contact may consist of notification by telephone to Bioarchaeology Program staff or the State Archaeologist; but such communication must be followed-up in writing via email or letter. Subsurface investigations in known (or possible) mounds, cemeteries, or other burial areas **may not be undertaken** without direct authorization from the OSA Bioarchaeology Program Director or State Archaeologist. If necessary, a field inspection will be conducted to determine the exact relationship of the burial site to the proposed project.

8.1.1.2. Newly Discovered Ancient Human Remains Encountered Prior to Construction

If human bone, or suspected human remains, are encountered in an obviously disturbed situation such as on the surface of a plowed field, within a distinct plowzone, or in a secondary deposit such as a sandbar or bank slump deposit, the find will be located precisely and an archaeologist should thoroughly inspect the area in question to try to determine the point of origin of the skeletal material without further subsurface disturbance. Even if the point of origin cannot be determined, the archaeologist should collect the disturbed remains and bring or forward them to the Office of the State Archaeologist to be identified, or have them identified by a qualified specialist after informing the OSA Bioarchaeology Program Director or State Archaeologist. The responding archaeologist is strongly advised to document a detailed chain of custody if human remains are removed from the site of origin and transported to a location off site.

If the remains are identified as human, the Bioarchaeology Director and State Archaeologist will consult with the federal and State agencies (if any), the SHPO, Indian Advisory Council, affiliated tribe(s) (if affiliation can be determined), and the project archaeologist, regarding subsequent steps. Ultimately, all ancient human remains and associated funerary objects that the State Archaeologist agrees cannot be preserved in place must be released by the federal agency if federal jurisdiction applies and delivered to the OSA for inventory and reburial or repatriation unless from federal or tribal land. If *in situ* bone that appears human is encountered, it should not be exposed or excavated any more than is necessary to determine that the remains are human. If the archaeologist

is uncertain that the bones are human, then digital photographs should be sent to the Office of the State Archaeologist and examined by a qualified specialist, for positive identification. Grave associated artifacts should also remain *in situ*. The archaeologist should photograph the *in situ* remains, record their exact locations, cover and protect them, discontinue the investigation at this point and immediately contact the OSA Bioarchaeology Program Director or State Archaeologist to coordinate field inspection and consultation.

After consultation with the OSA Bioarchaeology Program Director or State Archaeologist, archaeologists may test questionable “mounds” to the extent necessary to determine whether they are prehistorically constructed mounds, natural landforms, or the result of modern earthmoving activity. Probing with a 1" core hand probe is an acceptable method of testing. Results of testing are to be submitted to the OSA Bioarchaeology Program upon completion. A request for the use of additional sub-surface testing techniques may be considered by the State Archaeologist and OSA Bioarchaeology Director if results of probing are inconclusive. Stratigraphic zonation, features, and artifact content should be taken into account in determining whether these features are mounds. A determination that a feature is an aboriginal mound may be made without necessarily encountering human bone.

Use of non-intrusive geophysical techniques is encouraged where appropriate to identify mound and non-mound burials. The OSA Bioarchaeology Program should be consulted before and during such fieldwork and provided results.

8.1.1.3. Newly Discovered Ancient Human Remains Encountered During Construction

If human remains, or suspected human remains, are encountered in an actively worked construction area, the construction workers, foreman, and supervisor should be aware that to proceed would be intentional disinterment without permission, a breach of Iowa law (Iowa Code, Chapters 263B and 716.5), and could lead to prosecution. Every effort should be made to temporarily discontinue construction activities within the vicinity of the discovery. An appropriate buffer depends on local conditions of depth of find, slope, and the nature of construction activities; protection of sufficient area around the discovery location of human remains is the responsibility of the discoverer and the firm or organization responsible for the work leading to the discovery. If possible, someone should be left to oversee the discovery location, and if necessary, county or state law enforcement officials contacted to provide site security. The OSA Bioarchaeology Program Director or State Archaeologist should then immediately be contacted. If no one is available to remain on the site, *in situ* remains should be photographed and surface finds collected before departure; no buried or partially buried remains should be removed, rather they should be covered and protected.

8.1.2. Historical Burial Sites

Marked historical burials less than 150 years old are covered under Chapter 566 (Sections 566.31 and 566.32) of the Iowa Code, and require a permit from the Office of Vital Statistics for disinterment (Chapter 144.34). Unmarked historical cemeteries that may be close to or less than 150 years old may present challenges in determining jurisdiction. Qualified archaeologists may be the only professionals who have the training and resources necessary to accurately determine the age of remains and possible associated grave furniture. The Office of the State Archaeologist is the appropriate authority to first contact upon discovery, with a determination to follow regarding subsequent official notification of appropriate authorities.

8.1.3. Obviously Recent Human Remains

If human remains are encountered which are obviously of recent origin (e.g., if any flesh or clothing are still discernible), the appropriate county or state law enforcement officials and the County Coroner should be contacted. Remains should not be collected or otherwise disturbed if a crime may be involved.

8.2. GIS Modeling

Since the advent of modern Geographic Information System (GIS) software in the 1980s, archaeological site suitability modeling (also called “predictive” modeling) has proven to be a useful tool in the planning stages of cultural resource management and the Section 106 process. A well designed, tested, and revised model can guide project planning in the consideration of viable alternatives and aid in identifying those with reduced site potential. It can also focus direct field efforts. The *Secretary of the Interior’s Guidelines for Identification* (National Park Service 1983: 44722) define predictive modeling as the:

application of basic sampling techniques that projects or extrapolates the number, classes, and frequencies of properties [sites] in unsurveyed areas based on those found in the surveyed areas. Predictive modeling can be an effective tool during the early stages of planning an undertaking, for targeting field survey and for other management purposes. However, the accuracy of the model must be verified; predictions should be confirmed through field testing and the model redesigned and retested if necessary.

Modern modeling techniques for archaeological site suitability typically fall in the “inductive” category. These data-driven models rely on the comparison of known site data to environmental datasets (e.g. soil type, slope, distance to water, existing landform models, etc.). Areas of low to high site suitability are then calculated through a correlative modeling process. Based on the assumption that known sites occur within a known range of environmental or other conditions, then similar areas are inferred to possess higher site suitability than dissimilar areas. This assumption lies at the base of all inductive modeling and should be considered throughout the process as it assumes *all* site types are represented and that data from previously surveyed areas are adequate for the delineation of lower site potential areas. It also assumes that all site types are known and represented in the data universe.

When it comes to developing an archaeological predictive model, any number of variables may be used. These may include widely available existing datasets (e.g. soil maps, stream/water body locations, lidar derived data, aerial imagery, plat maps). Another acceptable source of data would be tested datasets compiled specifically for a defined area or project (e.g. geomorphology data, landform models). The responsibility is on the modeler to ensure that all data used in a model are accurate and reliable, in terms of both spatial location and tabular attributes.

The scale at which the spatial data are considered accurate is especially important, and great caution should be exercised in using data of different horizontal accuracy in the same model. For example, sites digitized in the I-Sites file are not intended to be used at a scale any larger (i.e., “zoomed in” closer than 1:24,000). Using 1-m-resolution lidar-derived topography to model site locations using I-Sites polygons would yield dubious results, because the topography (an independent variable) is being modeled at a much higher resolution than the site boundaries (the dependent variable).

The reliability and utility of a model is only as good as the data from which it is built. This makes it imperative that all variables used be clearly defined, and the reasoning behind their inclusion clearly stated, so that users of the model can judge for themselves its usefulness. Models must be built in such a way as to incorporate and adjust to newly introduced data in order to avoid being static, quickly outdated, and self-prophesying.

Within GIS software there is an ever-growing number of methods and techniques for modeling various inputs and extrapolating archaeological site suitability. Logistic regression and weights of evidence are two techniques that have been used in Iowa modeling. The methods used or techniques employed must be specified in the model documentation. Resulting models should be classified into a user-friendly, statistically based scale from Low to High potential with the delineations clearly defined in the model documentation.

To improve overall accuracy for planning document purposes, archaeological suitability modeling in Iowa should at a minimum differentiate historic-era site potential from prehistoric site potential. Settlement, subsistence and site locational strategies for these two broad periods were fundamentally different, and different variables and approaches to modeling must be considered. Additional refinements can also be made to differentiate specific historic or prehistoric site type potential. Again, all input variables must be clearly defined with supported rationale.

One primary caution when interpreting models of archaeological site potential, is to clearly state the limits of the data upon which the model is based. Ideally, datasets employed in model building will contain metadata that explicitly define the inferred accuracy of the data. For example, lidar data are generally utilized not as the “raw” point data format in which it was collected, but as a derivative product with inferred accuracy (e.g. digital elevation models, hillshade models). As these products are models in and of themselves, understanding and explicitly stating their underlying accuracy level is key to not over-interpreting results. For instance, if the initial raw point data were not collected at a level sufficient to detect small or low mounds in heavy canopy, then interpreting a derived elevation model or hillshade to conclude there are no mounds in such an area is erroneous, if based solely on lidar data.

As a second example, consider the process of modeling potential historic-period site locations based on georectified imagery (e.g. General Land Office maps, historic county atlases, and historic aerial imagery). Significant baseline data can be interpreted from these sources, but a number of data quality and data relevance variables must be considered and should be explicitly stated as part of the suitability model. Among these variables, was the original intent and format of the source data detailed enough to support the conclusions being drawn in the modeling process? Was the scanning and georectifying process conducted at a level sufficient to support the interpretations? Historic county atlases may not plot all farmstead locations, rivers and streams may be highly generalized, and historic aerial imagery may be misaligned.

It is imperative that the inherent limitations of the data sources going into a model be clearly stated and thoroughly considered throughout the modeling and reporting process. As these models are often titled “Predictive,” every effort should be made to clearly express their more accurate “Suitability” or “Potential” characteristic.

The use of predictive models in relation to Section 106 was initially addressed by the Advisory Council on Historic Preservation (ACHP) in 1983 and concludes that “the usefulness of a model...is directly linked to its quality, its comprehensiveness, and its reliability” (as quoted in Kaufmann 2006: 249). For planning document purposes, coarse-grained and untested models should not be utilized to delineate site potential in specific areas. No model can ever be considered to predict site locations with 100% accuracy. For this reason, in 1999 the ACHP advised that modeling never be used to make a determination of “No Historic Properties Affected” (Kaufmann 2006: 249). However, since that advice was offered, state databases of sites and survey areas, and the understanding of site location patterning, has evolved to a point at which such uses of modeling can and have been made. Such uses of modeling however, must only be undertaken in consultation with, and with written SHPO concurrence, in the form of a Programmatic Agreement.

8.3. Geophysical Studies

The goal of archaeological geophysical studies should be to identify the potential of areas below ground for intact archaeological deposits, including those that may have the potential to yield information about sites that would be considered eligible for the National Register of Historic Places (NRHP). In the field, information from geophysical studies can be used to locate areas where archeological deposits might be located horizontally and vertically. However, for evaluating a site for its eligibility for listing in the NRHP, subsurface investigations are necessary to confirm anomalies and to confirm the significance of any archaeological deposits.

8.3.1. Definitions

Remote sensing: Remote sensing uses various techniques to collect information about objects or areas from a distance, such as aerial photography, satellite imagery, and lidar (laser techniques for examining the earth's surface). These techniques detect properties of features at the ground surface. Remote sensing is useful for initially investigating large horizontal areas and locating archaeological surface features such as mounds, temples, roads, and irrigation systems.

Geophysical remote sensing: Geophysical remote sensing uses various electrical, magnetic, and acoustic techniques for examining the subsurface. These techniques are useful for initially investigating large horizontal areas or deeply stratified areas.

Archaeological Geophysics is the application of geophysical methods to investigate and answer questions about the subsurface at archaeological sites. These techniques may recognize some archaeological features, but will typically not recognize all features or archaeological deposits. Such techniques may provide initial data to support additional geomorphological and archaeological investigations. These methods may be used in initial stages of investigation or for potential management considerations, but they should always be used in conjunction with other techniques for confirmation and evaluation of archaeological resources.

Anomaly: A discrete area which has values, resulting from signals that were generated by geophysical equipment, that are distinct from other values adjacent to and surrounding it, is termed an anomaly. Anything archaeological must differ geophysically from its surroundings to be detected, and there must be a contrast between the archaeology and the surrounding matrix. An anomaly includes a series of geophysical signal reflections with interpretations of the differences that may indicate the presence of something archaeological. However, many other things produce anomalies (equifinality). Therefore, archaeological anomalies are typically compared to previous geophysical studies for confirmation of signal interpretation.

Noise and Clutter: These are discrete anomalies that are caused by interference in the equipment signal penetration or reception. These anomalies are random or unwanted variability in the data caused by variations from the sensor, weather, operator, differences in the soil matrix, or the site conditions and are not of archaeological interest, but can affect interpretation and understanding of the data.

8.3.2. Recommendations

Archaeological geophysical techniques are used primarily to create images or maps of potential archaeological features, or subsurface layers, which may contain archaeological materials. The data are collected from machines that are pushed, pulled, or carried across the surface at regular, non-arbitrary intervals. The equipment used for archaeological purposes typically records differences in soil properties, from the surface of the earth to a depth of 1 to 2 meters (three to six/seven feet). The benefits of these technological approaches are that very large areas can be investigated in relatively short time frames at a much-reduced cost compared to manual or machine excavation, and the techniques are non-destructive to the soils being investigated. Because results of these techniques can vary depending on local conditions, subsequent test excavations are typically recommended to confirm ("ground-truth") the results.

Some examples of the applications for different types of geophysical equipment, and the anomalies they are capable of identifying archaeologically include: Magnetometry as a tool for detecting burned features and pits filled with topsoil/midden, mound construction, historic site foundations, and in some cases, unburned graves; Resistivity as a tool for identifying site conditions and soil moisture differences, large pit features, mound footprints, large house structures, and historic site foundations; and Ground Penetrating Radar (GPR) as a tool for detecting large, hard features and pits filled with rocks/gravel/sand in silty or clayey soil, mound floors and distinct fill, historic grave shafts, coffins or rock-capped graves, and historic site foundations.

Current best practices for conducting archaeological geophysical investigations include strategies that are consistent with current Phase I (pedestrian surface survey and shovel test survey) methods. Archaeological geophysical surveys are typically conducted along defined transects with a prescribed distance from each other and within survey blocks. Equipment specifications, such as readings or samples taken per meter of distance covered, vary between different types of equipment, but the smaller the interval, the more precise the data that are collected. Wider intervals create a large margin for error and a greater likelihood for data omission. Thus, the wider the intervals or survey blocks, the more information that reflects the potential for archaeological resources is missed. Similarly, the signal setting of the equipment affects the depth of penetration and the equipment's ability to recognize anomalies. In theory, the more precise the signal setting, the more detail can be retrieved from the geophysical data. Modern practices have revealed that in most cases the application of more than one geophysical method is necessary to accurately identify archaeological anomalies. Therefore, it is recommended that at least two different methods be applied to the same research area when using geophysics as part of archaeological investigations.

Any problems that may affect the results of archaeological geophysical studies should be researched prior to applying such techniques. For example, an area that has radio interference from outside power sources (e.g., overhanging power lines) may inhibit the effective collection of certain types of geophysical electrical equipment, or dense tree cover may inhibit the effective collection of acoustic (GPR) signals. Therefore, areas that have interference from outside sources may not be the best locales for the application of archaeological geophysical methods. The causes of other noise or clutter should be described and explained if possible. If any issues arise during the computer processing of the data, such as those resulting from an electrical interference, the problems and their effect on the interpretation of the data should be made explicit in the reporting of the archaeological geophysical study.

A separate technical appendix, chapter, or report about the geophysical investigations should be included with archaeological reporting. In some cases, the information from these studies could be integrated into report text. The geophysical report should include the following as a minimum: the scope and purpose of the geophysical survey in relation to the archaeological research questions and goals; the location of the geophysical survey within the project area; geophysical techniques and field methods applied; manner of computer processing for the data; maps to convey the data with a scale, north arrow, caption, the date the map was generated, source data, and a key to any symbols used; and the results and interpretations of the data.

8.4. Rock Art Sites

This chapter describes the recommended techniques and procedures for conducting archaeological investigations of rock art cultural resources.

A rock art site is defined as any location with shapes painted or carved into rock surfaces by prehistoric or historic Native American Indians. They may be located on exposed rocks, bluff faces, rock shelters, or in caves. The most common of these may exist in the form of a pictograph or petroglyph. A pictograph is a symbol, figure, or geometric design painted on the rock surface. A petroglyph is a symbol, figure, or geometric design that has been carved, pecked or incised into the rock surface. Pictographs and petroglyphs may also occur simultaneously in the same design or at the same rock art site. Another less prevalent form of rock art is called a petroform. Petroforms are rock alignments located in open spaces or unsheltered landscapes. In Iowa many rock art sites are located on private property and the rights of the private landowner should be respected with regard to these resources.

8.4.1. Pre-Field Methods for Rock Art Sites

The following list comprises some preliminary considerations that should be accounted for prior to surveying rock art sites.

Many rock art sites carry importance with modern Native American Indian tribes and may be considered traditional cultural properties. Sufficient background research should be conducted to ascertain if the rock art site under investigation has been associated as a sacred place or traditional cultural property by existing Native American groups and care should be taken to account for their concerns.

Because many rock art sites have been exposed for hundreds if not thousands of years, they are often very fragile and eroded. The pictographs and petroglyphs may have also been tampered with or modified by graffiti during the early Euro-American (historical) period. Care should be taken when touching rock art sites because the surface of the rock may not be stable and touching the rock may cause pieces of the rock to break away. For these reasons direct contact with the rock art should be minimal.

Curation quality gloves should be worn when working with rock art sites because the oils on the human hand may be damaging to the site. Vegetation growing on the surface of any rock art should not be removed because it can be damaging to the pictograph or petroglyph. No cleaning or scrubbing of the rock face with harsh abrasives or cleansers should occur. This may damage the pictograph or petroglyph and affect future analysis. A fine mist of distilled water is currently the only recommended agent to apply to a rock art site.

Experience in photography, drawing, and mapping is very important because these methods constitute the base for investigation of a rock art site. Rock art sites are typically considered eligible for the NRHP under Criteria C and D.

8.4.2. Field Methods and Survey for Rock Art Sites

Field methods for survey of rock art sites consist mainly of recordation of the shapes, symbols, and figures on the surface of the rock art through field notes, maps, drawings, photographs (black & white, color, slide, infrared, and ultra-violet), videography, and other advanced recording technology. There are several steps to rock art survey including the rock art site survey, adjacent landscape survey, and subsurface survey. One or all of these may be applicable to the investigation.

The survey of the rock art site itself should be detailed and comprehensive. Where possible, hand sketched maps and drawings should be made of the site and pictographs or petroglyphs, in some cases by an individual experienced in rock pictograph or petroglyph documentation. In some cases it may be more practical to hand sketch the figures from a slide projected on a wall. However, in no circumstance should rubbings, chalking, or plaster casting be employed on rock art sites as this method may destroy the rock art.

Some rock art sites have too many figures for hand sketches to be a plausible form of recordation for the rock art. In such instances still photography is much more time efficient. Additionally, photographic techniques and methods may reveal concealed figures or portions of figures that are not apparent to the human eye. Infrared and ultra-violet photography is recommended to enhance details of pictographs. It is also recommended to photograph the rock art from directly in front of the image to be photographed and not at an angle. Some cover from direct sun is also recommended because sunlight will cause shadows that may interfere with discernment of the rock art. Under certain lighting conditions, inscriptions can be brought out by raking the surface with light using a mirror, a technique used by cemetery researchers to retrieve eroded inscriptions on grave markers. When documenting rock art inside rock shelters or caves, flash photography and special camera settings will be necessary.

8.4.3. Landscape Survey Adjacent to Rock Art Sites

An additional landscape survey of the surrounding area is recommended to aid in understanding the context of the rock art site and search for additional portions of the site that may not be readily visible. Subsurface investigations may also be necessary to substantiate integrity of the rock art site or link other habitation or activity areas to the rock art site. The best visibility for surveying rock

art sites is when the leaf foliage is at a minimum; that is, usually in the fall, winter and early spring months.

8.4.4. Documenting Rock Art Sites

Within a rock art site, there is specific information that should be recorded concerning the art itself. The following list gives some of the recommended information that should be recorded from the art itself at a rock art site.

- Whether the figures are pictographs or petroglyphs.
- The number of complete shapes or figures and which are pictographs or petroglyphs.
- The number of partial shapes or figures and which are pictographs or petroglyphs.
- The total size of the decorated rock surface.
- The size of the rock art portion of the site compared to the entire site.
- Drawings of the figures with their size, location, orientation, and any disturbances (graffiti) in a scale ratio 1:1 to the wall or rock surface they are located on.
- Size, type, design, paint analysis (where applicable), depth of carving (where applicable), cross section of the carved line (where applicable) for each shape or figure.
- The type of rock material that the shape or figure is located on.
- Whether the surface of the rock was prepared before the art was applied.
- The presence of any vegetation, lichens, worts, or moss on the figure.
- Any historical graffiti or modification to the shape or figure.
- The condition and degree of preservation for each shape or figure.
- Petroform sites should have all rocks, boulders, rock densities, and areas where rock appears to have been cleared away mapped at a 1:1 scale.

With new technology, the age of rock paintings may be determined using accelerator mass spectrometry (AMS), radiocarbon dating or other methods. However, this type of analysis is destructive and should only be undertaken by an individual with expertise in investigating and dating rock art sites.

8.4.5. Conservation of Rock Art Sites

Recommendations regarding the continued conservation of rock art sites should be stated in the final report. A management or stewardship plan should be devised for the rock art site. In many cases, monitoring is currently the most productive method to assure the maintenance of site integrity. Limiting access to the site by using fences or other barriers may also protect rock art sites. Techniques such as color enhancement, repainting, recarving, growth removal, rock art removal, cleansers, and brushing should not be used in an attempt to preserve the rock art or remove modern graffiti.

8.5. Geoglyphs and Other Sacred Sites

For decades, Native American informants have been telling archaeologists that there are ritual sites and sacred locations where human beings interacted with non-human (spirit) beings. But except for obvious surface features, such as earthen mounds or rock art, we have not known how to look for subtle evidence of ritual practices until Sebastian (Bronco) LeBeau pointed the way in his 2009 dissertation on Siouan sacred geography (LeBeau 2009). We approach this discussion with the understanding that for American First Nations the universe is pervaded by powers beyond the limitations of human knowledge. The Lakota phrase for this state is Wakan, i.e., “unknowable presence” (Walker 1980:70). Doing archaeology puts modern humans in contact with all things

and sites once deemed holy by the people who created and experienced them. One way to delineate holy landscapes is to recognize the context of ritual sites and to be familiar with clues to the ideological functions of specific features, “animated” objects, and spiritual places. Spatial context is the most perceptible dimension of the sacred. High points are associated with the Above World, while wetlands, rivers, springs and caves typically represent the Below World in Native American beliefs of the mid-continent (see Hall 1997). Another contextual dimension is site environment. For First Americans, all things in Nature that might be connected, affected or changed by people possess a spiritual presence—animals, plants, rocks and raw material outcrops, waters, primordial muds, the wind, soils, sunlight, hills and mountains, bluffs, weather patterns, etc. All sacred localities and ritual places are identified with specific things or non-human beings in Nature, which may or may not be obvious in a material way. “Vision quest” pits and enclosures on the northern Plains are examples. Here are two archaeological examples of sacred sites in Iowa.

The archaeological evidence for geoglyphs consists of interconnected trenches and post molds of “black” and “gray” types (Benn et al. 2015a; Thompson 2015). Black trenches containing small diameter post molds and other isolated post molds are filled with very dark brown humic soil mixed with fine charcoal, indicating wooden stakes and posts had been punched into the trenches and subsequently had burned or rotted in place. Gray trenches and associated post molds showed no evidence of burning. At 20 cm below surface (the upper B horizon at Pierson Creek), sectioned black trenches consisted of hand-dug grooves (originally in sod) roughly 20 cm wide and 20 cm deep containing a line of stakes averaging about 8 cm diameter (range about 5–15 cm) and rammed at 10–25 cm intervals about 50 cm deep into the Bt horizon. Many blackened trenches were capped by amorphous carbon smears at the upper AE soil horizon boundary, suggesting a wooden superstructure had been attached to the stakes to create a low screen or fence. Larger posts 17–30 cm diameter had been inserted within trenches or around trench enclosures perhaps as memorial poles. Black and gray trenches at the Pierson Creek (13WD130) and Yaremko (13WD134) sites consisted of short, straight segments joined at various angles as they jogged back and forth to form small enclosures and zoomorphic forms. These small enclosures were part of a larger array oriented to the four directions (winds) at Pierson Creek. Zigzagging trenches at the Yaremko site formed images of turtles, bison, anthropomorphs, and other zoomorphic forms that also appear on many rock art sites. At the Good Earth geoglyph site (39LN108) in South Dakota, it seems likely that zoomorphic and humanoid geoglyph figures were associated with mound construction (Benn et al. 2015b).

During a mound survey at Saylorville Lake during the fall of 2015, a bird effigy mound (13PK1042) was located on the edge of a high bluff (Thompson and Benn 2016) far to the west of the Effigy Mound tradition in southern Wisconsin. To analyze this site without digging, first study its landform context, because a mound is not an isolated feature on its landscape. The “head” of this bird effigy overlooks the deep Des Moines River valley, while its tail is a low ridge pointing upslope to a small wetland apparently created by mounding a low ridge. Although wetland features called glacial kettle lakes are common on the Des Moines Lobe, this is the first wetland located along the Des Moines River valley bluff line, which is sharply dissected and absent closed depressions. Thinking in the manner of Robert Hall (1997), the bird mound represents the Above World, while the wetland represents a portal to the Below World. Were this bluff spur to be tested off-mound, one might find aspects of the cosmos represented by subsurface features. Similar “water features,” once thought to have been “borrow pits,” have been studied at the Fort Ancient site in Ohio (Sunderhous and Blosser 2006:141).

8.6. Underwater Archaeological Investigations

This chapter describes the recommended techniques and procedures for conducting archaeological investigations of archaeological sites that are currently or have been inundated, partially or completely, or submerged with water. Site examples include cultural resources such as

fish weirs, canoes, shipwrecks, docks, or historic foundations, or other structures that extended into the water.

Because underwater archaeology in Iowa is a new and relatively unexplored research avenue, it is anticipated that these guidelines will require future modification to encompass changes in technology related to underwater investigations in the Midcontinental region. Underwater archaeological resources should be treated according to other cultural resources addressed in the *Secretary of Interior's Standards. The Abandoned Shipwreck Act; Final Guidelines (1990)* prepared by the National Park Service in Federal Register Vol. 55, no.233, pages 50116-50145 should be followed.

Underwater investigations should be conducted by a qualified underwater archaeologist in accordance with the Abandoned Shipwreck Act Final Guidelines (National Park Service 1990a) and Register of Professional Archaeologists (RPA) professional standards. The Principal Investigator should have sufficient expertise in underwater project planning, field methods, reconnaissance techniques, conservation and curation of artifacts recovered from inundated contexts, and report preparation. Additionally, if the underwater resource is maritime related, the Principal Investigator should be capable of demonstrating knowledge and expertise pertaining to historic watercraft and the shipping industry in the Midwestern region of the United States. If the underwater resource is a prehistoric inundated site, the Principal Investigator should be capable of demonstrating knowledge and expertise pertaining to the prehistoric period in the Midwestern region of the United States. Investigations and any diving activities should adhere to the American Academy of Underwater Sciences (AAUS) guidelines.

An Investigation and/or Evaluation Plan should be submitted to the SHPO for recommendations prior to conducting any field investigations. This should be in a written report format. A verbal agreement may be reached with the SHPO if circumstances dictate. However, this verbal agreement should be followed with a written verification of the Evaluation Plan.

Any special permit considerations should be taken into account prior to the implementation of any fieldwork. The Principal Investigator is responsible for researching and obtaining any necessary permits associated with conducting archaeological research on state bottom lands, including but not limited to US Army Corps of Engineers or Iowa Department of Natural Resources (DNR) permits that may be required to disturb bottom sediments in the course of the investigation or excavations. Other permit considerations to conduct underwater research in the project area, such as vessel operation, vessel anchoring, diving operations, OSHA safety, and labor standards, should be investigated.

Archival research, including a comprehensive literature and records search, should be conducted for the project area prior to any implementation of field investigations. Archival research should be conducted according to Iowa's guidelines for Phase I survey. Research should be conducted to include at a minimum known or suspected shipwrecks, harbor structures, other prehistoric or historical remains that may have been inundated, data on construction or inundation, builder's plans, and present location of known or suspected sites. Sources consulted should include local and county historical societies, Midwestern maritime museums, historians, divers, archaeologists, and other individuals or repositories having information relative to the prehistory, history, navigation, shipwrecks, waterfront and harbor development of the project area.

Phase I identification should be conducted with coverage, methods, and techniques adequate to identify all significant archaeological resources, both prehistoric and historical, within a project area. Remote sensing instrumentation should represent the most reliable or accurate technology available and be properly maintained, calibrated, and operated. All data retrieved from remote-sensing equipment should be legible, accurate, and properly annotated. Remote-sensing equipment should include at a minimum those tools that will provide information to effectively identify submerged archaeological sites. These types of equipment include a navigation/positioning control

system (GPS), marine magnetometer, side-scan sonar, and sub-bottom profiler. Other equipment that should be used to document these resources include a navigation/positioning control system (GPS), camera (terrestrial and/or underwater), and depth recorder/fathometer. Optional equipment could include a sub-bottom profiler, underwater cameras, and submersible vehicles. Additional equipment considerations may include tools such as bottom coring devices or submersible vehicles. The purpose and rationale for all equipment use should be clearly explained. The equipment and methods must be adequate to identify prehistoric or historic archaeological resources within the project area.

The survey should cover the proposed project area and any areas adjacent to the project that will be affected by construction activities. Survey transects should be conducted in parallel lines at regular intervals, sufficient to adequately investigate the project area (maximum of 50 meter intervals). Smaller magnetic anomalies and sonar targets should be further examined and/or verified by diver reconnaissance. Subsurface anomalies should be further examined and/or verified through sub-bottom investigations using acoustic technologies or testing strategies, such as manual or hydraulic probing or test excavation when deemed appropriate. All remote sensing and field data should be represented in an appropriate manner by verbal and written descriptions, photography, and/or videography, and results should be included with reporting, manual or hydraulic probing, or test excavation using induction dredge, airlift, or water jet.

Materials recovered from underwater archaeological sites have additional conservation and curation requirements. Therefore, they require special consideration and specific requirements should be included with individual project scopes of work and artifact custody agreements. Materials removed from wet or submerged context should receive treatment under the supervision of a conservation professional meeting the code of ethics and guidelines of practice of such organizations as the American Institute for Conservation (AIC) and the International Institute for Conservation (IIC). Further, these materials should be conserved and curated following federal guidelines 36 CFR 79, *Curation of Federally-Owned and Administered Archeological Collections*, and accepted professional guidelines.

Chapter 9: Special Considerations

This chapter describes some special considerations for conducting archaeological investigations in Iowa. It makes recommendations regarding safety issues, monitoring, and unanticipated discoveries.

9.1. Safety and Emergency Procedures

Archaeologists and project sponsors should be reminded that archaeological field investigations must comply with federal and state Occupational Safety and Health Administration (OSHA) regulations. OSHA federal standards that apply to archaeological field investigations are found in 29 CFR 1926.650, 1926.651, 1926.652 (Trenching and Excavation Standards), subpart P, and portions of 1926 Appendices A through F. The entire 1926 manual may be purchased from OSHA by calling (414) 297-1304 or may be accessed through the OSHA web site. An OSHA compliance officer in Iowa at (515) 284-4794 may also answer questions regarding federal OSHA regulations. The State of Iowa OSHA has adopted state standards according to Standard Number 1953 published in the *Federal Register* 55:27520-21, *Federal Register* 57:8367, and *Federal Register* 60:39970-39971. Iowa OSHA is responsible for enforcement of OSHA standards in Iowa. Iowa OSHA can be contacted at (515) 281-3606 for questions or concerns.

9.2. Recommendations for Safety with Recovered Hazardous Waste

Archaeologists should also be aware of other safety issues, such as procedures to follow when hazardous wastes are encountered. OSHA federal standards that may apply to archaeological field

investigations involving hazardous waste are: 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response), 1926.59 (Hazardous Communication Standards), and 1910.1200 (General Industry Standards). When hazardous materials are encountered on an archaeological investigation, the consultant should assess the need for continued investigations and adjust methodology accordingly. If an archaeological investigation involving hazardous waste proceeds, all individuals working on the project should be OSHA certified and comply with all OSHA regulations. Archaeologists working under conditions involving hazardous materials should be 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certified.

9.3. Recommendations for Safety with Recovered Ammunitions

General recommendations for safety concerns regarding live ammunition encountered on an archaeological investigation are to leave the live ammunition in place and notify the proper authorities. The Principal Investigator or field or crew supervisor should clear the area of all personnel immediately and then notify the local sheriff or bomb squad. The consultant and any personnel should not return to the vicinity of the live ammunition until the proper authority gives consent to return to the area. A compliance officer from the Bureau of Alcohol, Tobacco, and Firearms at (515) 284-4857 or Explosive Ordinance Disposal (EOD) professionals from the National Guard may be able to answer questions or concerns regarding live ammunition encountered during an archaeological investigation.

9.4. Emergency Salvage Safety Considerations

If an emergency necessitates archaeological salvage, all safety considerations complying with OSHA should be observed. The Advisory Council on Historic Preservation (ACHP) has stated that human life is more important than a cultural resource. "Emergency Undertakings" are defined by the ACHP as undertakings resulting from an officially-declared disaster or state emergency.

In regulatory archaeology compliance, federal undertakings from an emergency that will not be implemented within 30 days of the emergency declaration should go through the Section 106 process outlined in 36 CFR Part 800. In such circumstances an agency may choose one of two courses of action. An agency may elect to waive Section 106 requirements and comply instead with requirements of 36 CFR Part 78. When an agency proposes an emergency action as an essential and immediate response to a disaster declared by the President or Governor, the agency may notify the Advisory Council and SHPO/THPO of its proposed actions and afford them an opportunity to comment within seven days, if circumstances permit.

9.5. Monitoring During Construction

As previously discussed in these guidelines, wise planning for the protection of archaeological resources takes time and monitoring during construction generally is not recommended. Cultural resource considerations should be fully addressed before any construction work is initiated. Some situations may dictate monitoring prior to or during construction. Consultation with the SHPO/THPO should occur prior to implementation of these activities. Monitoring activities are directed by terms outlined in an executed agreement.

9.6. Unanticipated Discoveries

Sometimes, even though appropriate archaeological cultural resource identification and investigation procedures have been followed, discoveries are made during construction work. A previously unrecorded historic property might be encountered, or a known property might yield new kinds of information. It is strongly recommended that project sponsors have an unanticipated discovery plan in place prior to the onset of construction activities. The SHPO may be contacted for additional information.

References

Advisory Council on Historic Preservation

- 1980 Treatment of Archeological Properties: a Handbook: a Guide to Principles, Procedures, and Methods for the Treatment of Archeological Properties in Accordance with 36 CFR Part 800. Approved by the Council's Archeology Task Force September 26, 1980; Endorsed by the Advisory Council November 5, 1980. Washington, D.C. Online at www.hathitrust.org. Accessed September 2, 2017.

Benn, David W., Lowell Blikre, and Brennan J. Dolan

- 2015a Phase III Data Recovery Excavations at the Yaremko Site (13WD134), Woodbury County, Iowa. Draft. BCA 1962. Bear Creek Archeology, Inc., Cresco, Iowa. Prepared for the Iowa Department of Transportation, Ames.

Benn, David W., Branden K. Scott and Derek V. Lee

- 2015b Phase II Testing of the Proposed Visitors Center Locations, Good Earth State Park, Blood Run Site (39L0108), Sioux Falls, South Dakota. BCA 2108. Bear Creek Archeology, Inc., Cresco, Iowa. Prepared for the South Dakota Department of Game, Fish and Parks, Pierre, South Dakota.

Department of the Interior

- 1995 Native American Graves Protection and Repatriation Act Regulations (Final Rule), Federal Register 60:232 (December 4, 1995), pp. 62134 - 62169. Also available at Code of Federal Regulations Title 43, Part 10 (i.e., 43 CFR 10).

Derry, Anne, and Patricia L. Parker

- 1985 Guidelines for Local Surveys: A Basis for Preservation Planning. National Register Bulletin 24. National Register of Historic Places, Interagency Resources Division, National Park Service, U.S. Department of the Interior, Washington, DC.

Hall, Robert L.

- 1997 An Archaeology of the Soul. University of Illinois Press, Urbana.

Interagency Resources Division.

- 1991 Guidelines for Completing National Register of Historic Places Forms. National Register Bulletin 16A. U.S. Department of the Interior, National Park Service, Interagency Resources Division, Washington, D.C.
- 1995 How to Apply the National Register Criteria for Evaluation. National Register Bulletin 15. U.S. Department of the Interior, National Park Service, Interagency Resources Division, Washington, D.C.

Kaufmann, Kira E.

- 2006 A Specific Example: Recommendations from the State of Iowa. In GIS and Archaeological Site Location Modeling, eds. Mark W. Mehrer and Konnie L. Wescott, pp. 243 – 254. CRC Press, Taylor and Francis Group, LLC. Boca Raton, Florida.

LeBeau II, Sebastian C. (Bronco)

- 2009 Reconstructing Lakota Ritual in the Landscape: the Identification and Typing System for Reconstructing Cultural Property Sites. Unpublished Ph.D. dissertation, Graduate School, University of Minnesota, Minneapolis.

Lee, Antoinette J. and Linda F. McClelland

- 1999 How to Complete the National Register Multiple Property Documentation Form. National Register Bulletin 16B. Revised edition. U.S. Department of the Interior, National Park Service, Washington, D.C.

Little, Barbara, Erika Martin Seibert, Jan Townsend, John H. Sprinkle, Jr. and John Knoerl

- 2000 Guidelines for Evaluating and Registering Archeological Properties. National Register Bulletin 36. U.S. Department of the Interior, National Park Service, Washington, D.C.

National Park Service

- 1983 Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (Notice). Federal Register 48:190 (October 17, 1983) pp. 44716 – 44742. Online at www.loc.gov/item/fr048190/; Accessed September 21, 2017.
- 1990a Abandoned Shipwreck Act (Final Guidelines). Federal Register 55:233 (December 4, 1990) pp. 50116 – 50145. Online at www.loc.gov/item/fr055233; Accessed September 21, 2017.
- 1990b Curation of Federally-Owned and Administered Archeological Collections. Code of Federal Regulations, Title 36, Part 79. Online at www.nps.gov/archeology/tools/36CFR79.htm; Accessed September 5, 2017.

Occupational Safety and Health Administration

- 1989 Safety and Health Regulations for Construction. Code of Federal Regulations, Title 29, Part 1926, Subpart P, Excavations.
- Hazardous Waste. Code of Federal Regulations, Title 29, Part 1926, Subpart D, Occupational Health and Environmental Controls, 1926.59 Hazard Communication.
- Hazardous Materials. Code of Federal Regulations, Title 29, Part 1910, Subpart H, Hazardous Materials, 1910.120 Hazardous Waste Operations and Emergency Response.
- Toxic and Hazardous Substances. Code of Federal Regulations, Title 29, Part 1910, Subpart Z, Toxic and Hazardous Substances, 1910.1200 Hazard Communication.
- 1990 Iowa State Standards (Notice of Approval). Federal Register 55:128 (July 3, 1990) pp. 27520 – 27521.
- 1992 Iowa State Standards (Notice of Approval). Federal Register 57:46 (March 9, 1992) pp.8366 – 8367.
- 1995 Iowa State Standards (Notice of Approval). Federal Register 60:150 (August 4, 1995) pp. 39970 – 39971.

Prior, Jean Cutler.

- 1991 Landforms of Iowa. University of Iowa Press for the Iowa Department of Natural Resources, Iowa City.

Renaud, Susan L. Henry., and Geoffrey M. Gyrisco

- 1993 Protecting Archeological Sites on Private Lands. U.S. Dept. of the Interior, National Park Service, Preservation Planning Branch, Interagency Resources Division, Washington, D.C.
-

Schoeneberger, Philip J., D. A. Wysocki, and E. C. Benham.

- 2012 Field Book for Describing and Sampling Soils. Online at
<<http://purl.fdlp.gov/GPO/gpo41808>>.

Seifert, Donna J.

- 1995 Defining Boundaries for National Register Properties. National Register Bulletin 21. U.S. Department of the Interior, National Park Service, Interagency Resources Division, National Register of Historic Places, Washington, D.C.

Sunderhaus, Ted S., and Jack K. Blosser

- 2006 Water and Mud and the Recreation of the World. In *Recreating Hopewell*, eds. D.K. Charles and J.E. Buikstra, pp. 134 -145. University Press of Florida, Gainesville.

Thompson, Joe B. (editor)

- 2015 Phase III Data Recovery on the Late Woodland Pierson Creek Site (13WD130), Union Township, Woodbury County, Iowa. Draft. BCA 1872. Bear Creek Archeology, Inc., Cresco. Prepared for the Iowa Department of Transportation, Ames.

Thompson, Joe B., and David W. Benn

- 2016 Phase I Mound Assessment and Expanded Reconnaissance Surveys in Saylorville Reservoir, Polk County, Iowa. BCA 2174. Bear Creek Archeology, Cresco, Iowa. Prepared for the Rock Island District Corps of Engineers, Rock Island, Illinois.

Vogel, Gregory

- 2002 A Handbook of Soil Description for Archeologists. Arkansas Archeological Survey, Fayetteville, Arkansas.

Walker, James, R.

- 1980 Lakota Belief and Ritual. Edited by R. J. DeMallie and E. A. Jahner. University of Nebraska Press, Lincoln.
-