Appendix A: Bibliography

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Appendix B - Terminology

Above-grade archeological features
: Features with discernible topographic relief on LiDAR imagery or through visual observations.

Archeological feature
: The element(s) of a landscape that contributes to the significance and that can be the subject of a treatment intervention. Examples include a earthen walls, mounds, borrow pits, scatter, and remnants of structures.

Archeological landscape
: A geographic area that includes archeological, cultural, and natural resources that may be associated with a historic event, activity, or person. The archeological landscape include both below- and above-grade archeological features.

Below-grade archeological features
: Features with no discernible topographic relief on LiDAR imagery or through visual observations, but are evident utilizing magnetometry or by other archeological investigations.

Borrow pit
: A depressional area that may have been excavated by the Hopewell people to construct earthworks, or intentionally created as a water feature.

Building
: A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity.

Character-defining features
: A prominent or distinctive aspect, quality, or characteristic of an archeological landscape that contributes significantly to its physical character. Earthen walls, mounds, borrow pits, structures, vegetation, spatial relationships, views, and materials may be such features.

Contributing Feature
: A feature that contributes to the significance of the archeological landscape.

Crop
: Yearly cultivated crop species, generally corn, soybeans, or wheat.

Earthen wall
: An earthwork that creates an enclosure of a designed and specific configuration. The Hopewell people constructed earthen walls in squares, circles, octagons, and other geometric forms. Multiple earthen walls are often combined into unique geometric configurations.

Earthworks
: Constructed or intentionally manipulated piles of placed soil or rocks. Built by the Hopewell people, these include earthen walls, mounds, and borrow pits.

Earthwork Complex
: Constructed by the Hopewell people, a designed grouping of archeological features (earthen walls, mounds, borrow pits, etc.) that may function as ritual, ceremonial, and burial places.

Enclosure
: The interior space defined by constructed, geometric earthen walls.

Gateway
: An intentional break in an earthen wall, that may have been an entrance or gateway into the ceremonial earthwork complex. In Hopewellian construction, mounds were often located at gateway locations.

Hay Fields
: Primarily grass species with regular or occasional cultivation. Within the park units, it is generally an Orchardgrass-Timothy-Fescue-Goldenrod species blend with a wide variety of shrub or herb meadows. Introduced grasses have been planted or volunteered into old fields, with goldenrod as the primary species. Shrubs may or may not be present, but generally account for less than 25% of the total cover. Common shrubs include dogwood, sumac, blackberries, and eastern red cedar. Non-native shrubs commonly include multi-flora rose, Japanese honeysuckle, and Russian olive.

Historic Character
: The sum of all visual aspects, features, materials, and spaces associated with an archeological landscape's history, i.e. the original configuration together with losses and later changes. These qualities are often referred to as character-defining.

Hopewell
: The term "Hopewell" describes a broad interregional network of different American Indian groups during the Middle Woodland period. They left no written language and little is known about their daily life, including what they called themselves. The name "Hopewell" refers to Captain Mordecai Hopewell who owned a farm that contained the major archeological site, known today as Hopewell Mound Group.

Integrity
: The authenticity of a property's historic identity, evinced by the survival of physical characteristics that existed during the property's historic or prehistoric period. The seven qualities of integrity as defined by the National Register Program are location, setting, feeling, association, design, workmanship, and materials.

Mound
: An artificial elevation of the earth constructed by the Hopewell people as ceremonial or burial places.

Mown Lawn
: Mown lawn includes turf grass species that are mown regularly.

Native Grasslands
: A combination of planted grasses and forbs. In the park units, it usually includes a combination of big bluestem, indiangrass, switchgrass as dominant species. Both native and non-native grasses and forbs tend to volunteer in areas that have been planted with prairie grasses and forbs. Other important species include Canada goldenrod, sideoats grama, blackeyed and browneyed susan, wild bergamont, and stiff goldenrod. Shrubs and small trees include Pennsylvania blackberry, American elm, multiflora rose and slippery elm.

Non-Contributing Feature
: A feature that does not contribute to the significance of the archeological landscape.

Ornamental Planting
: Ornamental planting areas may include trees, shrubs, perennials, and groundcovers. It generally includes non-native or introduced plant species. Ornamental planting areas may include trees, shrubs, perennials, and groundcovers.

Park Unit
: The NPS jurisdictional boundary, including inholdings.

Preservation
: Includes measures necessary to sustain the existing form, integrity, and materials of extant archeological features, including earthen walls, mounds, and borrow pits. Work may include stabilization measures and ongoing maintenance.

Reconstruction
: Includes the previously reconstructed archeological features at Mound City Group (earthen walls, mounds, and borrow pits) and Seip Earthworks (Seip-Pricer Mound and a portion of the earthen wall). The reconstructed features were built, by means of new construction to the size, scale, and configuration reflective of the most accurate archeological studies and investigations at that time.

Restoration
: Includes measures necessary to depict the form of the earthwork complex as it appeared during the period of significance, through the removal of non-contributing features and reconstruction of missing features.

Rehabilitation

Includes measures necessary to depict the spatial form of the earthwork complex as an interpretive element. Earthen walls, mounds, and borrow pits may be marked with rock cobble, vegetation, or defined with earthen construction to depict the spatial qualities of the earthwork complex.

Riparian

Vegetation typical to floodplain forests and along rivers or streams. In the park units, the riparian community is dominated by a combination of silver maple (Acer saccharinum), sycamore (Platanus occidentalis), hackberry species (Celtis spp.), American elm (Ulmus americana), and green ash (Fraxinus pennsylvanica). Vines, including eastern poison ivy (Toxicodendron radicans) and creepers (Parthenocissus spp.) are often abundant. Most areas are under water for some period each spring, and microtopography is important for defining water regimes on a local scale.

Shrubland

Woody shrub and tree species account for most of the vegetation coverage in shrublands. In the park unit, this includes areas that show evidence of heavy human use (clearing, plowing). Woody species volunteer into these cleared areas more or less spontaneously, and vegetation is dominated (>80% cover) by ruderal or exotic species. A wide variety of woody species may be present, and these species may occur as monodominant or mixed stands. Some typical woody dominates include eastern red cedar (Juniperus virginiana), pines (Pinus spp.), hawthorns (Crataegus spp.), red maple (Acer rubrum), honey locust (Gleditsia triacanthos), and black walnut (Juglans nigra). Other associated shrubs and herbaceous species are generalist species.

Significance

The meaning or value ascribed to a archeological landscape based on the National Register criteria for evaluation. It normally stems from a combination of association and integrity.

Site

A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.

Structure

The term “structure” is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.

Treatment

Work carried out to achieve a particular historic preservation goal.

Type-site

The first archeological site discovered for a particular culture. Hopewell Mound Group is the type-site of the Hopewell Culture.

Woodland

Hardwood forest or woodlands that within the park units show evidence of heavy human use (clearing, plowing). Woody species volunteer into these cleared areas more or less spontaneously, and vegetation is dominated (>80% cover) by ruderal or exotic species. A wide variety of woody species may be present, and these species occur as monodominant or mixed stands. Some typical woody dominates include eastern redcedar (Juniperus virginiana), pines (Pinus spp.), hawthorns (Crataegus spp.), red maple (Acer rubrum), honey locust (Gleditsia triacanthos), and black walnut (Juglans nigra). Other associated shrubs and herbaceous species are generalist or ruderal species.

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Appendix C: Spruce Hill Preserve

Introduction

This document presents an abbreviated Cultural Landscape Report (CLR) for the Spruce Hill Preserve, an affiliated property owned and managed by the Arc of Appalachia. The property was added to the legislated boundary of Hopewell Culture NHP in 2009 as it possesses the same resource management issues as the NPS owned park units. These include questions on how to address the desired landscape condition, long-term maintenance, protection of resources, the potential for opening and interpreting the site to visitors, and identifying future studies and resource needs.[1]

This abbreviated CLR includes an overview of the earthwork's historical development, a general description of the property's existing condition, an analysis of integrity, and general treatment recommendations. The intent of this document is to record the complex's existing condition based upon secondary information, provide a preliminary assessment of integrity, and provide initial recommendations for its preservation and continued stewardship.[2]

This abbreviated CLR was conducted at a limited level of investigation, relying on secondary sources that were readily available. Background information includes maps and drawings provided from the NPS archives and files, and previous archeological reports on file. A brief field investigation in October 2014 provided an initial review of the complex's existing condition; however, overgrown vegetation limited the extent of the investigation.

Study Area

Spruce Hill Preserve is a nationally significant property associated with the Hopewell Culture of southern and central Ohio, which developed between 1 AD and 400 AD. The complex is west of Chillicothe, Ohio in Ross County. Spruce Hill is a 150-acre archeological complex sited on top of a flat-topped mesa that juts out from the Paint Valley floor, approximately 300 feet above Paint Creek. Seip Earthworks, another park unit of Hopewell Culture NHP, is to the west approximately 10 miles. Spruce Hill's archeological features consist of a series of stone walls that enclose the level mesa of the hill, and circumscribe the top of the bluff. Spruce Hill is accessed by an abandoned road. The complex is currently closed to the public however it may be opened to the public in the future

Park Significance

The monumental architecture and artifacts of the Hopewell Culture reflect a pinnacle of achievement in the fields of art, astronomy, mathematics, and engineering, the likes of which was seldom seen again in eastern North America. The Hopewell Culture was a critical period in the development of an agricultural lifestyle that sustained later populations. "It is clear they had a stable society, capable of major efforts to build earthworks, as well as establishing their network of contacts with other peoples."[3] They produced sculptures of stunning grace, skill and beauty, and had a complex spiritual and ritual life.[4]

[1] NPS, Hopewell Culture NHP Scope of Work for CLR / EA, 2014, 3.
[2] NPS, Hopewell Culture NHP Scope of Work for CLR / EA, 2014, 3.
[3] NPS, Draft General Management Plan / Environmental Assessment, 3.
[4] *Hopewell Culture National Historical Park, Ohio, Long-Range Interpretive Plan (*NPS, 1997), v.

Spruce Hill is a rare extant example of a large hilltop 'fortress.' Built between 1 AD and 400 AD, it was likely used for ceremonies rather than defense. While other major ceremonial sites were built on the level floodplain along rivers, only a few complexes, including Spruce Hill, were built upon hilltops. The Spruce Hill complex is unique in that its walls are made entirely of stone, as opposed to earthen walls, typical of other Hopewell earthworks. Spruce Hill retains integrity as many of its archeological features remain unchanged by development or agriculture in the past 200 years. Hopewellian hilltop enclosures remain among the least studied and least understood type of Hopewellian architecture. Spruce Hill has immense potential for further research and investigations that might answer questions about the Hopewell Culture.[5]

Abbreviated Site History

Around 1 AD the Hopewell Culture emerged as the dominant culture of the Scioto River Valley. The Hopewell built large ceremonial earthworks that typically spanned several acres. These were used for ceremonies and burial sites. During this time, Spruce Hill was built of stacked stone at the edge of the hilltop. It is unknown how Spruce Hill was used by the Hopewell people.

Spruce Hill was first recorded by Caleb Atwater in 1820. He described Spruce Hill Works in "Description of Antiquities Discovered in the State of Ohio and Other Western States," and created the first known map of the complex. Atwater assumed Spruce Hill was built as a defensive military fortification. His drawing describes the site as a "Stone Fort, situated on a hill between 300 and 400 feet high." The drawing shows two openings into the 'fort,' one on the north and one on the east, as well as roads leading to / from each opening.[6] Atwater described the wall as built of undressed sandstone with 30 'furnaces' marked by burned clay and cinders thought to be the by-product of brickmaking or ironworking.[7]

The earthworks along the Scioto River Valley were extensively investigated by amateur archeologists Ephraim George Squier and Edwin Hamilton Davis from 1845 to 1847. The two documented all six park units of Hopewell Culture NHP as well as many others in the region, including Spruce Hill. The survey completed of Spruce Hill by Squier and Davis labeled the complex simply as "Ancient Stone Work near the Village of Bourneville." It indicated a portion of the interior of the complex as farmland with two structures within the stone walls and a central pond.[8] A large portion of the enclosure was forested. They described the stone walls as forming curved gateways, which clearly rose above the natural outcrop and rise of the hill.[9]

The Spruce Hill hilltop enclosure did not produce many artifacts in comparison to the earthworks in the river valleys, and as such not much archeological work was completed after these early studies. A few other archeologists including Warren Moorhead in the 1890s recorded Spruce Hill, but did not work extensively at the complex. In 1934, Emerson Greenman conducted the first professional

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5 "Saving Spruce Hill, Native American Earthworks & Appalachian Cove Forest," *Arc of Appalachia Preserve System*, http://www.arcofappalachia.org/arc/spruce-hill.html (accessed January 23, 2015).

6 Caleb Atwater. "Description of the Antiquities Discovered in the State of Ohio and Other Western States." Archaeologia Americana: Transactions and Collections of the American Antiquarian Society 1, (Worchester, MA: William Manning, 1820).

7 Bret Ruby, "Spruce Hill Earthworks: The 1995-1996 National Park Service Investigations." In, Mark Lynott, *Footprints: In the Footprints of Squier and Davis*, *Archeological Fieldwork in Ross County*, *Ohio.* (Lincoln, NE: NPS, 2009), 50.

8 E.G. Squier and E. H. Davis, *Smithsonian Contributions to Knowledge*, *Vol. 1. Ancient Monuments of the Mississippi Valley: Comprising the Results of Extensive Original Surveys and Explorations* (New York: Smithsonian Institution, 1848), Plate IV.

9 Squier and Davis, *Ancient Monuments of the Mississippi Valley*, 12.

archeological excavations at Spruce Hill. He discovered quantities of 'slag' along the rock wall. He assumed this was a result of an intense fire of a structure.[10] The site was not investigated again until 1948 when Captain Arlington Mallery visited and claimed to find evidence of several 'bloomery' furnaces similar to Iron Age examples from Northern Europe. Mallery believed the site was from a northern European Iron Age occupation, a theory that is not sustained by credible evidence.[11] In the 1990s, additional work was completed at similar complexes with furnace-like features. It was determined that the burned stone and soil at Spruce Hill differs from that at other sites, and is a different phenomenon.[12]

In 1972 the site was added to the National Register of Historic Places. In 1988 the Archaeological Conservancy considered acquiring Spruce Hill. However, a reconnaissance indicated that the walls were not necessarily man-made features and if they were, they were too damaged, resulting in the Conservancy abandoning its plans. When Hopewell Culture NHP was established in 1992, Spruce Hill was not included in the group of park units. Instead, the enabling legislation directed archeological studies be undertaken to evaluate the desirability of adding Spruce Hill to the park.[13] These studies were undertaken between 1995 and 1996. They described, surveyed, and mapped the site. In 1995, the Arc of Appalachia Preserve System was founded. Together with the Ross County Park District, they purchased the land and began to co-manage Spruce Hill as an archeological complex. In 1998 a summary report on the "Significance, Suitability and Feasibility of the Spruce Hills Works as a Potential Addition to Hopewell Cultural National Historical Park" was authored by the National Park Service. Spruce Hill was added to the park's legislated boundary in 2009.

Existing Condition and Analysis

This section provides an overview of the existing condition of Spruce Hill, based upon the 2014 CLR limited field investigations and review of readily available archeological studies, historic records, and maps. This section evaluates Spruce Hill through four landscape characteristics.

- Spatial Organization / Topography / Views
- Archeological Features
- Circulation
- Vegetation

Spatial Organization / Topography / Views

Spruce Hill occupies a prominent hill that is part of the Appalachian Plateau. The hill juts northward into the Paint Creek Valley, with the creek just below and to the north of the hill. The hill is steep sloped with a flat-topped mesa. The bedrock of the mesa is made of level sandstone.[14] The archeological site is entirely built upon the brow of the hill, artificially extending the height of the native rock outcropping. The steep hillside plunges downward from stone walls into Paint Creek, an elevation change of approximately 300 feet. The steep slope separates the mesa from the creek

[10] Emerson Greenman, "*Archaeological Field Work in North America during 1934*, *Ohio*" American Antiquity (1935), 127-128.
[11] Ruby, "Spruce Hill Earthworks," 51.
[12] Ruby, "Spruce Hill Earthworks," 51.
[13] Ruby, "Spruce Hill Earthworks," 49.
[14] Ruby, "Spruce Hill Earthworks," 49.

valley below. Views are obscured by vegetation, but if cleared, there would be views of the valley below and the hills opposite the river valley. Views across the mesa are not open due to overgrown vegetation. The spatial organization and topography are in good condition. The condition of views is unknown.

The spatial arrangement and topography of Spruce Hill remains from the period of significance. The topographic features are unchanged, and steep hillsides continue to physically separate the mesa on which Spruce Hill is built from the valley below. While is it unknown why the Hopewell chose to develop this complex, the spatial arrangement and topographical separation must have been critical in their choice of location. These characteristics are contributing features to the archeological landscape. Views from the period of significance are unknown.

Archeological Features

The archeological features of Spruce Hill consist of the stone wall, which is actually a series of walls that frame the irregular hillside and create an enclosure around the flat mesa of the hill. Other archeological features include the individual components of the wall — gateways, burned stones, and deposits. Spruce Hill has not been recorded by magnetometer or LiDAR; however, below-grade archeological features are likely present, but unverified.

The stone wall is difficult to discern in places. Where it is visible, the stone wall is a broad band (approximately 30 feet wide) of sandstone blocks extending just below the brow of the hill. The 1995 to 1996 survey noted: "as one nears the areas identified as 'gateways' at A,B, C, and D on the Squier and Davis map, the line of the feature rises above the brow of the hill and the density of stones increases markedly."[15] Area D on Squier and Davis's map indicates an 'Isthmus' where the stone wall separates the broad enclosed plateau of the north from the southern portion of the hill. These were not investigated for this CLR; however, the 1995 to 1996 survey documented this area, noting that it is the most easily traced portion of the wall. Other archeological features, including the burned 'furnaces' / burned rock and soil are not apparent, but are extant below-grade.

It is unknown how the stone wall appeared during the period of significance. Further research is needed to identify the full extent of the stone wall and its components, including the intensely burned rock at the site. Due to its elevated position and difficulty in accessing the mesa, Spruce Hill's archeological features have suffered less from the effects of agriculture and development than other Hopewell earthwork complexes. The Spruce Hill archeological features are contributing features of the archeological landscape.

Circulation

Access to Spruce Hill is from State Route 50. A turn-off onto Blain Highway leads to the base of the hill at the north end of the site at Black Run Road. A gate controls access to a level area for parking. An unimproved road, Spruce Hill Road, leads to the top of the hill at a distance of just over one-half mile. Visitors may enter with permission, but must hike up the hill on Spruce Hill Road. On the top of the hill, the road ends, and only pedestrian circulation is possible throughout the archeological complex. Spruce Hill Road is washed out in places with an uneven surface and is in fair condition.

Historically, the circulation system to the mesa likely followed the alignment of the gateways within the stone wall. In the mid-1800s, Squier and Davis recorded three gateways in the wall, and three

[15] Ruby, "Spruce Hill Earthworks," 54.

paths that led through the gateways. These routes likely date from the original construction, and it stands to reason that these were the original access points to the hilltop.

Since the period of significance, Spruce Hill Road was built to access the top of the mesa. This route was likely present during the time of the Hopewell, as it follows an easy grade up the hillside and aligns with one of the gateways in the stone wall. The route of Spruce Hill Road up the hillside contributes to the archeological landscape. Other routes are not extant and are unknown.

Vegetation

Spruce Hill is heavily vegetated, covered with a native, hardwood forest across the hillside and the majority of the mesa. The interior of the mesa is more open, covered with native grasses and shrubs.

It is unknown what the vegetation was during the period of significance. In the mid-1800s, based on the Squier and Davis map, half the mesa was cleared for farmland, and half was forested vegetation. Since it is unknown how the vegetation appeared during the time of the Hopewell, it is unknown if the existing vegetation patterns reflect the historic setting. Further research into the use of the complex is needed to provide insight into how the vegetation was maintained during Hopewell use.

Treatment Recommendations

This section presents the treatment recommendations for the preservation and stewardship of Spruce Hill Preserve. This treatment plan protects the archeological resources and fosters continued archeological research and investigations. This section provides a treatment approach, goals, and recommendations for the treatment of the archeological landscape.

Spruce Hill possesses many of the same resource management issues as the NPS owned park units. These include questions on how to address the desired landscape condition, long-term maintenance, protection of resources, and identifying future studies and resource needs.

A preservation approach is recommended for Spruce Hill Preserve. This approach allows for protection of the archeological features, and allows actions that sustain the existing form, integrity, and materials of the features. Actions are allowed that protect and stabilize the archeological features, and focus on ongoing maintenance and repair.

Treatment goals for Spruce Hill include the following:

- Preserve extant archeological features;
- Maintain the property as both a natural area and a significant archaeological site.
- Repair the spatial arrangement of the archeological site at the top of the bluff;
- Maintain access for staff and occasional visitors.

Treatment - Spatial Organization / Topography / Views

Spruce Hill Preserve is sited on top of a flat-topped mesa and archeological features consist of a series of stone walls that enclose the level mesa of the hill and circumscribe the top of the bluff. The spatial organization is characterized by the open mesa at the top of the bluff, surrounded by woodland vegetation on the slopes of the hill.

1. Strengthen the spatial organization by removal and management of vegetation.
    a. Remove trees and large shrubs that obscure the open setting of the mesa at the top of the bluff. Maintain the open grassland as open space.
    b. Maintain woodland vegetation on the slopes of the hill in order to enhance the sense of enclosure within the mesa.
    c. Remove vegetation from the stone walls at the edge of the bluff, to protect the material of the stone architecture.

Treatment – Land Use

Spruce Hill Preserve was added to the park's legislated boundary in 2009, and is owned and managed by the Arc of Appalachia.

1. Maintain the property as a natural area and archaeological site.
    a. Fulfill both needs compatibly, including both the protection of native biodiversity of the site, and the protection of the site's capacity to yield research for the professional archaeological community.
2. Develop a management plan to guide future actions by the NPS and its partners.
3. Consider property acquisition to protect all archeological resources.
    a. Only a portion of the archeological features are within the boundaries of the preserve, and land acquisition is necessary to protect these features is desirable.
    b. Develop public outreach and cooperation with private property owners to preserve archeological features on private land.
4. Continue to provide access for the Arc of Appalachia and NPS staff. Provide visitor access by permission and special tours as requested.
    a. Enhance public outreach and education of Spruce Hill Preserve through off-site programs.

Treatment - Archeological Features

Spruce Hill is a rare extant example of a large hilltop 'fortress,' unique in that its walls are made entirely of stone. The site retains integrity as many of its archeological features remain unchanged, and additional features are likely below-grade. The archaeological integrity of the site shall be protected at all times, and archaeological impact shall be researched before any educational development or archaeological research is developed. NPS shall continue to serve as the technical advisor who reviews and advises all archaeological research proposals submitted to occur on the property.

1. Preserve all below- and above-grade archeological features.
    a. Stabilize and repair stone walls as necessary, following best practices.
    b. Maintain the stone walls free of vegetation.
    c. Preserve areas of potential archeological scatter.
2. Continue investigations and archeological research.
    a. Conduct field investigations to verify the full extents and condition of the stone walls and related features. Record all extant archeological features, which may

include the individual components of the wall — gateways, burned stones, and deposits.

b. Identify currently unknown resources using magnetometry or other non-invasive archeological techniques.
c. Continue research on Hopewellian hilltop enclosures and Hopewellian stone architecture.

Treatment - Circulation

Currently a gated parking area connects to Spruce Hill Road which leads to the top of the hill. On the top of the hill, the road ends, and only pedestrian circulation is possible throughout the archeological complex. Treatment recommendations include retaining the existing circulation system and access.

1. Maintain existing circulation system to provide gated access to the vehicular parking area.
2. Maintain the existing pedestrian circulation system.
    a. Maintain and improve as necessary Spruce Hill Road to provide pedestrian access to the top of the hill.
    b. Add a mown grass pedestrian route at the edge of the stone walls, to follow the outline of the top of the bluff.

Treatment - Vegetation

Spruce Hill is covered with a hardwood forest across the hillside. The mesa has native grasses and shrubs, although forest grows at the edges.

1. Use vegetation management techniques to preserve the archeological features.
    a. Remove trees and woody vegetation that impact archeological features or diminish the complex's spatial qualities.
2. Utilize distinct vegetation management techniques to preserve the archeological features and to reveal the form and spaces of the complex.
    a. Use a mix of native herbaceous species, mown 1 to 2 times per year on the mesa.
        i. Consider a mowing rotation that is sensitive to ground-nesting birds (e.g. mow half the grasslands one year and half the next).
        ii. Maintain the grasslands free of invasive species.
        iii. Maintain the mesa free of trees encroaching into the open space.
        iv. Mow pedestrian paths more frequently, in order to provide access and accentuate the form of the complex.
    b. Maintain the hardwood forest on the hillside below the archeological features.
    c. Remove dead and dying trees and vegetation.

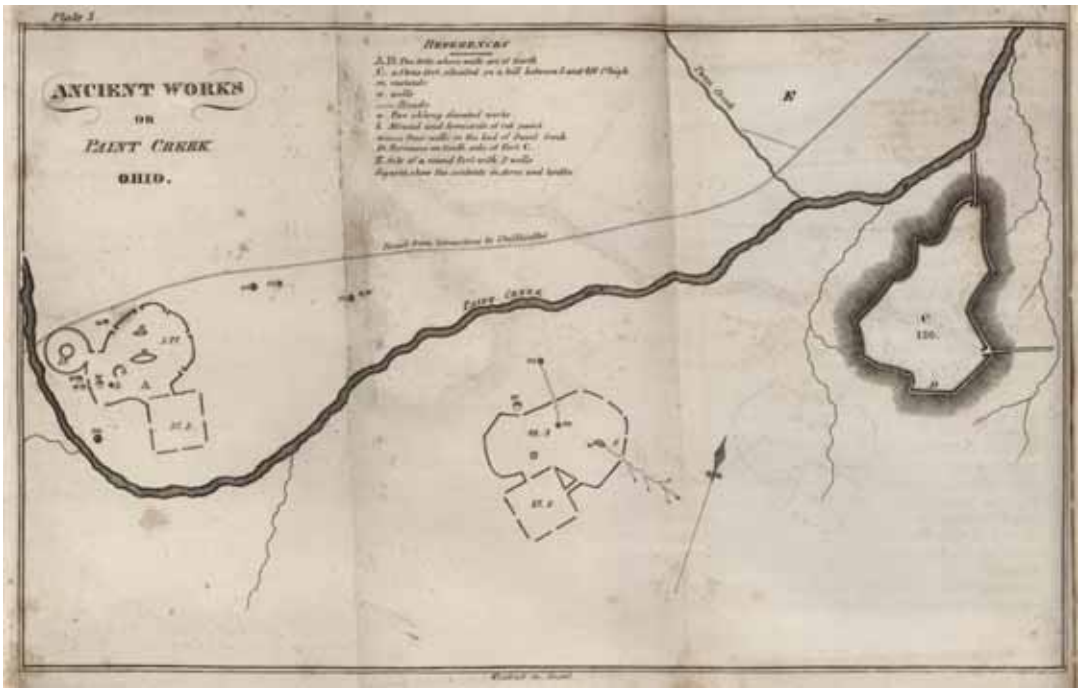

Figure 1. Caleb Atwater created the first known map of Spruce Hill in 1820, at far right. Seip Earthworks is on the far left. (Hopewell Culture NHP Archives)

Figure 2. In the 1940s, Arlington Mallery visited Spruce Hill to determine the cause of the burned rocks along the wall at Spruce Hill. He believed these served as bloomery furnaces for heating iron. (NPS)

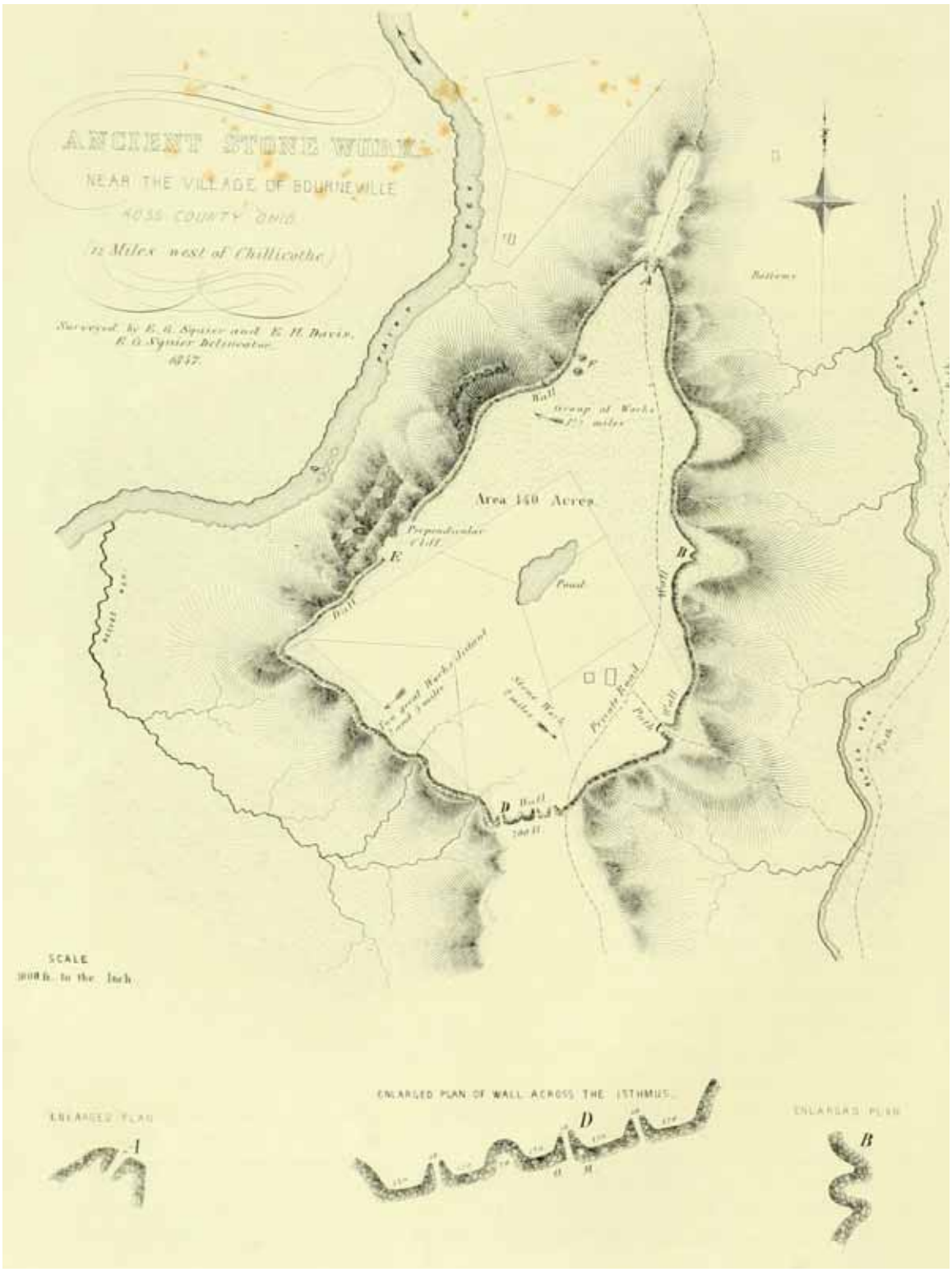

Figure 3. E.G. Squier and E.H. Davis mapped Spruce Hill in the mid-1800s as part of their archeological investigations of the Ohio River Valley. Note the gateways in the rock walls and the paths leading to the top of the hill. (Hopewell Culture NHP Archives)

Figure 4. In the winter, distant hills and valleys can be seen from the top of Spruce Hill. (NPS)

Figure 5. Spruce Hill is topographically and spatially distinct from the adjacent river valley. The hill is approximately 300 feet above Paint Creek. A flat, open mesa occupies the center of the hill. (Jeffery Wilson)

Figure 6. The level, open mesa at the top of Spruce Hill contrasts with the wooded hillside. (Quinn Evans Architects 2014)

Figure 7. The rock wall is more apparent at the gateways. Spruce Hill Road enters the top of the hillside through the prehistoric gateway. (Quinn Evans Architects 2014)

Figure 8. The rock wall is difficult to trace in places, but forms a nearly continuous berm at the crest of the hill. (Quinn Evans Architects 2014)

Figure 9. Some stones are visible along the wall and show evidence of high-temperature fire. (Quinn Evans Architects 2014)

Figure 10. The stone wall is a broad band (approximately 30 feet wide) of sandstone blocks extending just below the brow of the hill. (Quinn Evans Architects 2014)

Figure 11. Spruce Hill Road provides access to the top of the hill. It is not open to vehicular traffic. (Quinn Evans Architects 2014)

Figure 12. A mown path occurs through the mesa. Vegetation includes native and exotic grasses. (Quinn Evans Architects 2014)

Figure 13. The vegetation on the hillside of Spruce Hill is composed of a young, hardwood forest. (Quinn Evans Architects 2014)

Spruce Hill deed restriction:

Archeological Research and Historical Importance:

The archaeological integrity of the site shall be protected at all times, and archaeological impact shall be researched before any educational development or archaeological research is developed. The National Park Service at Hopewell Culture National Historical Park shall serve as the technical advisor who reviews and advises all archaeological research proposals submitted to occur on the property, ensuring that all approved research proposals conform with the same current regulations and guidelines that would apply to archaeological research occurring on federal property. Proposals from professional archeological researchers will be reviewed by the National Park Service and current owners of the site, and no permission will be given unless the National Park Service makes a positive recommendation concerning the research proposal, and the environmental protection and insurance requirements of the Owners are met. This property shall be protected into perpetuity as both a natural area and a significant archaeological site, and both purposes shall be met compatibly, including both the protection of native biodiversity of the site, and the protection of the site's capacity to yield research for the professional archaeological community.

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Appendix D : Archeological Investigations

Table C-2. Summary of Archeological Investigations

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1820	Caleb Atwater	Atwater, Caleb. *Archaeologia Americana: Transactions and Collections of the American Antiquarian Society, Description of the Antiquities Discovered in the State of Ohio and Other Western States,* Vol. 1. Worchester, MA: 1820.	Hopewell Mound Group; Seip Earthworks; Spruce Hill	This publication described earthworks throughout the Ohio Valley and contained some of the earliest descriptions and illustrations of Hopewell Mound Group, Seip Earthworks, and Spruce Hill.
1845 to 1847	Squier & Davis	Squier, E.G., A.M., and E. H. Davis, M.D. *Smithsonian Contributions to Knowledge, Vol. 1. Ancient Monuments of the Mississippi Valley: Comprising the Results of Extensive Original Surveys and Explorations.* New York: Smithsonian Institution, 1848.	Mound City Group; Hopeton Earthworks; Hopewell Mound Group; Seip Earthworks; High Bank Works.	Squier and Davis documented hundreds of Hopewellian earthwork sites in detail. They conducted surveys and limited excavations throughout the region.
1889	Cyrus Thomas	Thomas, Cyrus. *The Circular, Square, and Octagonal Earthworks of Ohio.* Washington D.C.: Smithsonian Institution Government Printing Office, 1889.	Hopeton Earthworks; High Bank Works	Described and surveyed the earthworks, noting their precise dimensions and corroborating with Squier and Davis on the mathematical accuracy of the earthworks.

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1890	Colonel Middleton, Bureau of American Ethnology	Thomas, Cyrus. "Report on the Mound Explorations of the Bureau of Ethnology." *Twelfth Annual Report of the Bureau of American Ethnology for the Years 1890-91,* Washington, D.C. 1894.	Hopeton Earthworks	The first detailed topographic survey at the Hopeton Earthworks, Colonel Middleton surveyed the site for the Bureau of American Ethnology in 1890.
1891	William H. Holmes		High Bank Works	Holmes and a team of surveyors from the USGS experimented with contour mapping techniques. Their results confirmed the geometric precision of the earthworks.
1891 to 1892	Warren K. Moorehead	Moorehead, Warren K. *The Hopewell Mound Group of Ohio.* Chicago: Field Museum of Natural History, 1922.	Hopewell Mound Group	Moorehead was one of the pioneering archeologists to work at the Hopewell Mound Group. He changed the site name from "Clark's Works" to be named after the landowner Mordecai Cloud Hopewell. He excavated approximately half of the mounds, including about a quarter of the largest mound, Mound 25. The artifacts he collected were displayed in the Columbian Exposition of 1893 in Chicago.
1906	William Mills		Seip Earthworks	
1908	William Mills		Seip Earthworks	
1920s	Henry Shetrone and William Mills, Ohio Historical Society	Mills, William C. "Exploration of the Mound City Group," *Ohio Archaeological and Historical Quarterly,* Volume 31, 423-584, 1922.	Mound City Group	Investigation of Mound City Group while Camp Sherman buildings were still extant. Reconstruction of several of the mounds.

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1921 to 1925 or 1926	Henry Shetrone and William Mills, Ohio Historical Society	Shetrone, Henry C. *The Mound-Builders.* New York: D. Appleton and Company, 1930.	Seip Earthworks	Excavated Seip Mound (Mound 1) and revealed floors, fire pits and burials of two very large connected buildings with a small building between them. Among the artifacts found was the famous clay Seip Head, copper breast plates, and intact samples of Hopewell cloth, woven of milkweed fibers. Seip Mound was partially reconstructed after excavation.
1922 to 1925	Henry Shetrone and William Mills, Ohio Historical Society	Shetrone, Henry C. "Explorations of the Hopewell Group of Prehistoric Earthworks," *Ohio Archaeological and Historical Quarterly, Volume 35*, 1-277, 1926.	Hopewell Mound Group	It was the archaeological excavations of Henry Shetrone in the 1920s that remain as the existing authority on the Hopewell Mound Group. Shetrone located and mapped the mound and earthwork locations, which remains a valuable tool today as the mounds become less visible. At the completion of his fieldwork, almost every mound had been excavated, if not by him, then by previous excavators. Shetrone concluded that these earthworks were a great ceremonial center (Hopewell CLI).
1925 to 1926	Spetnagel and Henry Shetrone, Ohio Historical Society		Mound City Group	Reconstruction
1931	Henry Shetrone & Greenman		Seip Earthworks	

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1945	Griffin		Mound City Group	
1959	John L. Cotter, NPS		Hopeton Earthworks	Site survey was completed by NPS archaeologist John L. Cotter to formulate a definite opinion as to the nature and value of the site.
1960s	Raymond Baby, Ohio Historical Society		Mound City Group; Seip Earthworks	Baby was contracted to rectify the differences between the Squier and Davis survey with the restoration work by Mills and Shetrone. James A. Brown from the Illinois State Museum served as Baby's on-site project manager throughout the 1963 field season. The 1963 archeological investigations indicated that Mounds 10 and 13 were reconstructed in the wrong place during the 1920's restoration efforts, as well as the entire southern enclosure wall.

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1963 through 1970s	Ohio Historical Society and James Brown, Northwestern University	Brown, James. *Inventory and Integrative Analysis: Excavations of Mound City, Ross County, Ohio, Overview of Archaeological Investigations of the Mound City Group National Monument.* Report on file, Hopewell Culture NHP, Chillicothe, Ohio.	Mound City Group	In 1963 through the 1970s, the Ohio Historical Society and James Brown of Northwestern University continued research on the site. They clarified locations of mounds, gateways, borrow pits, and conducted radiocarbon dating (Mound City, CLI). At Mound City, the earth walls at the southeast and east embankment were excavated (LCS, Earth Walls, Mound City Group, 3). Mound #10 at Mound City was excavated, revealing the remains of an early habitation structure (LCS, Mound #10, Mound City Group, 3). Mound #12 and #13 at Mound city was excavated (LCS, Mound #12, Mound City Group, 3). In 1963, Brown discovered an eighth pit in the southeast corner of the site, adjacent to the embankment wall. This discovery led to the interpretation that the pits may have a symmetrical arrangement, with one pit at each of the corners and a pit on either side of the gateways along the embankment walls
1964	Richard Faust		Mound City Group	Mounds #4 and #5 excavated and restored at Mound City Group (LCS, Mound #4, Mound City Group, 3; Administrative History, Chapter 4).

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1965			Mound City Group	The northeast embankment of the earthwork wall at Mound City was excavated (LCS, Earth Walls, Mound City Group, 3). Mound #5 at Mound City Group excavated and reconstructed by the NPS (LCS, Mound #5, Mound City Group, 3).
1966			Mound City Group	The east embankment of the earthwork wall at Mound City was excavated (LCS, Earth Walls, Mound City Group, 3).
1968			Mound City Group	Mound #17 at Mound City Group was excavated, and was restored to a diameter of 55-feet (LCS, Mound #17, Mound City Group, 3). Mound 23 was excavated.
1969			Mound City Group	Excavation at Mound City, Mound #1 and Mound #19 (LCS, Mound #1, Mound #19, Mound City Group, 3).
1970			Mound City Group	Mounds #6, #20, and #24 at Mound City Group were excavated (LCS, Mound City Group).
1971			Mound City Group	Mounds 11, 12, and 16 at Mound City were excavated (LCS, Mound City Group, 3).
1972	Shane	Orrin C. Shane. *Report on the Excavation at the High Bank Earthwork, Ross County, Ohio.* Paper presented at the Annual Meeting of the Ohio Academy of Sciences, Cleveland. 1973.	High Bank Works	Recorded and excavated. Five stratigraphic trenches excavated through the walls of the Great Circle and Octagon.

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1973			Mound City Group	Mound #15 at Mound City Group excavated (LCS, Mound #15, Mound City Group, 3).
1974			Mound City Group	Mound #14, #21, and #22 at Mound City Group excavated (LCS, Mound #14, Mound City Group, 3).
1975	Raymond Baby and Suzanne Langlois	Baby, Raymond S., and Suzanne M. Langlois. *Excavation of Sections 01 and 02 Mounds 8 and 9, Mound City Group National Monument.* Manuscript on file, Midwest Archeological Center, Lincoln, Nebraska. 1977.	Mound City Group	Mounds #8 and #9 at Mound City Group were excavated (LCS, Mound #8, #9, Mound City Group, 3).
1976	David S. Brose	Brose, David S. "An Historical Archaeological Evaluation of the Hopeton Works, Ross County, Ohio." Department of Archaeology, Cleveland Museum of Natural History, Cleveland, 1976.	Hopeton Earthworks	Archeological testing was completed by David S. Brose in order to determine the integrity and significance of the Hopeton Earthworks.
1979			Mound City Group	Excavation and reconstruction of Mound 9, Mound City Group (Administrative History, Chapter 4).

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1979	Raymond Baby and Suzanne Langlois	Baby, Raymond S. and Suzanne M. Langlois. *Seip Mound State Memorial: Nonmortuary Aspects of Hopewell. In Hopewell Archaeology: The Chillicothe Conference.* Edited by David Brose and N'omi Greber. Kent, Ohio: The Kent State University Press, 1979.	Seip Earthworks	
1979	N'omi Greber		Seip Earthworks	
1980 to 1981	Mark Seeman, Kent State University	Seeman, Mark F. "An Archaeological Survey of the Hopewell Site (33R027) and Vicinity." Submitted to the Ohio Historic Preservation Office, Columbus, Ohio, 1981.	Hopewell Mound Group	A site survey of the Hopewell Mound Group, accurately relocating most of the mounds through aerial photography and surface survey (Hopewell Mound Group CLI, 24). Surface collections and limited excavation.
1982	Lynott, Mark J. and Susan M. Monk		Mound City Group	The primary purpose of the study was to inventory and evaluate archeological resources which might be present in a 49.83 acre tract to the north of the National Monument boundary
1984	N'omi Greber & Shane		High Bank Works	Subject of multi-year archeological research conducted by Dr. Nomi Greber, Cleveland Museum of Natural History.

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1984	Ray Hively & Robert Horn	Hively, Ray and Robert Horn. "Hopewellian Geometry and Astronomy at High Bank," *Archaeoastronomy Supplement to Journal for the History of Astronomy,* Vol. 15 (S85-S100) 1984.	High Bank Works	After their investigations, Ray Hively and Robert Horn, of Earlham College, believed that the earthwork served as astronomical observatories. The earthwork incorporates alignments to the rising and setting of the moon through its 18.6-year cycle. The High Bank Earthworks also include alignments to the summer and winter solstice sunrises and sunsets.
1985	John Blank, Department of Anthropology, Cleveland State University, Cleveland.	Blank John E. *An Aerial Photo-grammetrical Analysis of the Hopeton National Historic Landmark, Ross County, Ohio.* Report on file, NPS, MWAC, Lincoln, NE. 1985.	Hopeton Earthworks	
1985	Mark Lynott and Susan M. Monk	Lynott, Mark J., and Susan M. Monk. "Mound City, Ohio, Archeological Investigations." *Occasional Studies in Anthropology,* No. 12. Midwest Archeological Center, Lincoln, Nebraska, 1985.	Mound City Group	
1990s	Bret Ruby, NPS		Hopewell Mound Group	

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
1994	NPS-MWAC		Hopeton Earthworks	The Midwest Archeological Center initiated a long-term study of the Hopeton Earthworks, beginning research in 1994 with a combination of geophysical surveys and strategic testing.
	Note: After 1994, refer to Annotated Bibliography by MWAC	Annotated Bibliography for Hopewell Culture National Historical Park (1995-2011), Kasey Mathiesen and Timothy Schilling, Midwest Archeological Center		
1995	N'omi Greber		Seip Earthworks	
1996	Bret Ruby, NPS		Hopeton Earthworks; Spruce Hill	
1997 to 1998	Mark Lynott		Hopeton Earthworks	
1999	N'omi Greber	Greber, N'omi. "Combining Geophysics and Ground Truth at High Bank Earthworks, Ross County, Ohio." *The Ohio Archaeological Council Newsletter II* (I):8-11, 1999.	High Bank Works	
2000	N'omi Greber and Ruhl			
2001	NPS & Ohio State University		Hopewell Mound Group	

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
2001 to 2003	Weinberger	Geophysical Explorations in Non-Mound Space at Hopewell Mound Group	Hopewell Mound Group	Geophysical survey
2001 to 2008	NPS		Hopeton Earthworks	Excavations were begun in 2001 and continued through 2008 to determine how the earthwork was constructed as well as to look further at anomalies found in the geophysical readings.
2001	Bruce Bevan	Bevan, Bruce. G*eophysical Tests at the Hopeton Mound Group.* Virginia: Geosight, 2001.	Hopeton Earthworks	
2001	Mark Lynott	Lynott, Mark J. "The Hopeton Earthworks: An Interim Report," *Hopewell Archeology,* 4(2): 1-5, 2001.	Hopeton Earthworks	
2002	N'omi Greber	Greber, N'omi. "A Preliminary Comparison of 1997 and 2002 Limited Excavations in the Great Circle Wall, High Bank Works, Ross County, Ohio." *Hopewell Archeology* 5(2):Article I, 2002.	High Bank Works	
2002	Mark Lynott		Hopeton Earthworks	
2002	Jarrod Burks		Mound City Group	

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
2002	Johnston		Hopewell Mound Group	
2002	Katherine A. Speilman	Spielman, Katherine A. "Field Notes for Hopeton Earthwork Unit 6 Excavations, Summer 2002." Manuscript on file, NPS, MWAC, Lincoln, NE.	Hopeton Earthworks	
2003	Mills		Hopewell Mound Group	
2003	Rolfe Mandel	Mandel, Rolfe D., Trina L. Arpin, and Paul Golderg. *Stratigraphy, Lithography, and Pedology of the South Wall at the Hopeton Earthworks, South-Central Ohio.* Kansas Geological Survey Open File Report 2003-46.	Hopeton Earthworks	
2004	N'omi Greber	Greber, N'omi. *Report to Hopewell Culture National Historical Park on 2004 Field Work at the High Bank Works.* Submitted to Hopewell Culture NHP, and the MWAC, Lincoln, NE, 2004.	High Bank Works	

Date of Investigation	Archeologist	Report	Site(s)	Key Findings
2005	N'omi Greber	Greber, N'omi. Report to Hopewell Culture National Historical Park on 2005 Field Work at the High Bank Works. Submitted to Hopewell Culture NHP, and the MWAC, Lincoln, NE, 2005.	High Bank Works	
2006	N'omi Greber	Greber, N'omi. Report to Hopewell Culture National Historical Park on 2006 Field Work at the High Bank Works. Submitted to Hopewell Culture NHP, and the MWAC, Lincoln, NE, 2006.	High Bank Works	
2007	N'omi Greber	Greber, N'omi. Report to Hopewell Culture National Historical Park on 2007 Field Work at the High Bank Works. Submitted to Hopewell Culture NHP, and the MWAC, Lincoln, NE, 2007.	High Bank Works	
2012	NPS		High Bank Works	High-resolution LiDAR topographic mapping
2012 to 2013	NPS	Burks	High Bank Works	Large-scale, high-resolution magnetic survey

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Appendix E : Spatial Data and Rationale

Mound City Group

Spatial Data and Rationale

Preparation of the Mound City Group existing conditions plan was completed in ESRI ArcMAP 10.2, AutoCAD 2013 and Adobe Illustrator. A basemap of the project area was assembled in ArcMAP from spatial data gathered from the Hopewell Culture National Historical Park GIS Database (courtesy of Bret Ruby), the U.S. Census Bureau, the State of Ohio Department of Transportation, the National Fish and Wildlife Service, and the FEMA. New spatial data layers were created or modified by the consultant to depict conditions at Mound City Group at the time of the site visit in October, 2014. To facilitate accurate mapping, all existing layers were projected to a consistent projected coordinate system (NAD_1983_UTM_Zone_17N) prior to production of new data. Process and rationale for the existing conditions layers is described below.

- *Unit Boundary:* Data provided by park in Ruby geodatabase

- *Existing roads (outside park boundary):* Spatial data from State of Ohio Location Based Response System road centerlines.

- *Existing roads, trails, buildings and structures, fences, and overhead lines (within park boundary):* Layer created by consultant based on park CAD files (Landuse.dwg,353040-3.dwg) and verified with Google Maps aerial photograph and consultant field observation, October 2014.

- *Waterbodies:* Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- *Floodplain:* Spatial data from FEMA National Flood Hazard Layer.

- *Wetlands:* Spatial data from http://www.fws.gov/wetlands/Data/Mapper.html.

- *Contours:* One foot interval contours developed by consulting team from digital elevation model provided by park.

- *Earthworks:* Spatial data for Mounds 1-25, Building Remnant 15, The Extant Above-Grade Earthen Wall, and The Extant Above-Grade Borrow Pits were provided by the park in the Ruby geodatabase. Extramural Mounds X1 and X2 were interpolated from the Contour Data, and the Unverified Borrow pit was traced from the 1965 General Development Plan, Part of the Master Plan.

- *Vegetation:* Spatial data modified by the consultant from the data provided by the park of the 2014 vegetation survey. The 2014 vegetation survey data was clipped to the current park boundary and modified based on field observations at the October 2014 site visit and 2014 aerial photographs.

- *Trees:* GPS data gathered at the time of the site visit in October, 2014.

Hopeton Earthworks

Spatial Data and Rationale

Preparation of the Hopeton Earthworks existing conditions plan was completed in ESRI ArcMAP 10.2 and Adobe Illustrator. A basemap of the project area was assembled in ArcMAP from spatial data gathered from the Hopewell Culture National Historical Park GIS Database (courtesy of Bret Ruby), the U.S. Census Bureau, the State of Ohio Department of Transportation, the National Fish and Wildlife Service, and the FEMA. New spatial data layers were created or modified by the consultant to depict conditions at Hopeton Earthworks at the time of the site visit in October, 2014. To facilitate accurate mapping, all existing layers were projected to a consistent projected coordinate system (NAD_1983_UTM_Zone_17N) prior to production of new data. Process and rationale for the existing conditions layers is described below.

- Unit Boundary: Data provided by park in Ruby geodatabase

- Property not in NPS ownership: Layer created by consultant based on boundary and tract data provided by park in Ruby geodatabase.

- Existing roads (outside park boundary): Spatial data from State of Ohio Location Based Response System road centerlines.

- Existing roads and trails (within park boundary): Layer created by consultant based on park CAD file (ccimow.dwg) and verified with ESRI 2014 aerial photograph and consultant field observation, October 2014.

- Waterbodies: Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- Floodplain: Spatial data from FEMA National Flood Hazard Layer.

- Wetlands: Spatial data from National Fish and Wildlife Service Wetlands Mapper.

- Railroad: Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- Contours: One foot interval contours developed by consulting team from digital elevation model provided by park.

- Earthworks: Spatial data was developed by the consultant based on Lidar, magnetometer, historic aerial photographs, and historic surveys. First, the consultant georeferenced magnetometer data from the 2004 and 2013 surveys to the location of the earthworks based on the 1996 survey grid used for all geophysical surveys at the site. The magnetometer surveys covered the area of the large circle enclosure, the large square enclosure, and an area southwest of the square enclosure south of the earthen causeway. All earthworks traced from the survey are coded on the plan as "known." Sections of earthworks that were recorded by the as visible on the site at the October 2014 site visit are coded on the plan as "known extant," while sections of earthworks that are only visible on the magnetometer scan are identified as "known below grade." Lidar data was used to verify the locations of these features. Magnetometer scan data

was most effective to identify the location of the square and large circle enclosures, however, the earthen causeway, small circular enclosures, mounds, and borrow pits were not visible on the scan or Lidar, or not within the area recorded by the scan. Visible portions of these features were traced from the 1938 aerial photograph of the site and labeled as "known below grade" on the existing conditions plan. All additional features which were not visible on the magnetometer, lidar, or historic aerial photograph were traced from Squier and Davis, 1846. As the georectified Squier and Davis plan does not align precisely with existing site conditions, the placement of these features is the least geographically accurate, and their location is indicated on the plan as "unknown." Features indicated as "Unknown" on the existing conditions plan should not be used as a definitive location for the earthworks.

- Buildings and Structures: Spatial data developed by the consultant based on 2014 aerial photographs and verified at the October 2014 site visit.

- Overhead Lines: Spatial data developed by the consultant based on 2014 aerial photographs and verified at the October 2014 site visit.

- Vegetation: Spatial data modified by the consultant from the data provided by the park of the 2014 vegetation survey. The 2014 vegetation survey data was clipped to the current park boundary and modified based on field observations at the October 2014 site visit and 2014 aerial photographs.

- Fences: Spatial data developed by the consultant based on HOCU CAD drawing ccimow.dwg and verified at the October 2014 site visit.

Hopewell Mound Group

Spatial Data and Rationale

Preparation of the Hopewell Mound Group existing conditions plan was completed in ESRI ArcMAP 10.2 and Adobe Illustrator. A basemap of the project area was assembled in ArcMAP from spatial data gathered from the Hopewell Culture National Historical Park GIS Database (courtesy of Bret Ruby), the U.S. Census Bureau, the State of Ohio Department of Transportation, the National Fish and Wildlife Service, and the FEMA. New spatial data layers were created or modified by the consultant to depict conditions at Hopeton Earthworks at the time of the site visit in October, 2014. To facilitate accurate mapping, all existing layers were projected to a consistent projected coordinate system (NAD_1983_UTM_Zone_17N) prior to production of new data. Process and rationale for the existing conditions layers is described below.

- Unit Boundary: Data provided by park in Ruby geodatabase

- Property not in NPS ownership: Layer created by consultant based on boundary and tract data provided by park in Ruby geodatabase.

- Existing roads (outside park boundary): Spatial data from State of Ohio Location Based Response System road centerlines.

- Existing roads and trails (within park boundary): Layer created by consultant based on park shapefile (Hopewell_Trail_GPS_2011 from Ruby geodatabase) and verified with ESRI 2014 aerial photograph and consultant field observation, October 2014.

- Waterbodies: Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- Floodplain: Spatial data from FEMA National Flood Hazard Layer.

- Wetlands: Spatial data from National Fish and Wildlife Service Wetlands Mapper.

- Railroad: Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- Contours: One foot interval contours developed by consulting team from digital elevation model provided by park.

- Earthworks: Spatial data was developed by the consultant based on Lidar, magnetometer, historic aerial photographs, and historic surveys. First, the consultant referenced magnetometer data from the 2013 survey to the location of the earthworks, using the georeferenced raster layer included in the Ruby geodatabase (Hopewell_Magnetics_2013). The magnetometer survey covered the area of the square enclosure, a portion of the Great Enclosure, small circle enclosure, and a portion of the D-shaped enclosure. All earthworks traced from the survey are coded on the plan as "known." Sections of earthworks that were recorded by the as visible on the site at the October 2014 site visit are coded on the plan as "known extant," while sections of earthworks that are only visible on the magnetometer scan are identified as "known below grade." LiDAR data was used to verify the locations of these features. Magnetometer

scan data was most effective to identify the location of the Great Enclosure, the circle enclosure, the D-shaped enclosure, and several mounds. The Square Enclosure and four mounds contained within it are not visible on the magnetometer scan. However, visible portions of the Square Enclosure were traced from the 1951 aerial photograph included in the park's geodatabase. These features were labeled as "known below grade" on the existing conditions plan.

While topography at the site is very flat, a number of existing features were able to be traced from the 2012 LiDAR scan. These features included several mounds and a portion of the north and west sides of the Great Enclosure and associated ditch. As with the earthworks visible on the magnetometer survey, all earthworks traced from the LiDAR are coded on the plan as "known." Sections of earthworks that were recorded by the as visible on the site at the October 2014 site visit are coded on the plan as "known extant," while sections of earthworks that are only visible on the LiDAR are identified as "known below grade."

All additional features which were not visible on the magnetometer, LiDAR, or historic aerial photograph were traced from four surveys conducted on the site: Squier and Davis' 1848 survey, Cowan's 1892 survey, Shetrone's 1926 survey, and Seeman's 1981 survey. All surveys of Hopewell Mound Group indicate slightly different conditions for the site, including varying numbers and locations of mounds, and none of the surveys align precisely with the magnetometer and LiDAR data. Due to these inconsistencies, the location of all earthworks placed using historic surveys of the site are indicated on the existing conditions plan as "unknown." As the most recent and most accurately fitting survey, Seeman's 1981 survey was used as the primary reference for placing the rest of the earthworks. Where Seeman's survey refers to mounds only located prior to 1930, the earlier survey was referenced for the mound or borrow pit location and form (Cowan, 1892 or Shetrone, 1926). Gateways, which were generally not specified on the Cowan, Shetrone, and Seeman surveys, were placed based on Squier and Davis, 1848. Features indicated as "Unknown" on the existing conditions plan should not be used as a definitive location for the earthworks.

- Buildings and Structures: Spatial data developed by the consultant based on 2014 aerial photographs and verified at the October 2014 site visit.

- Overhead Lines: Spatial data developed by the consultant based on 2014 aerial photographs and verified at the October 2014 site visit.

- Vegetation: Spatial data modified by the consultant from the data provided by the park of the 2014 vegetation survey. The 2014 vegetation survey data was clipped to the current park boundary and modified based on field observations at the October 2014 site visit and 2014 aerial photographs.

Seip Earthworks

Spatial Data and Rationale

Preparation of the Seip Earthworks existing conditions plan was completed in ESRI ArcMAP 10.2, AutoCAD 2013 and Adobe Illustrator. A basemap of the project area was assembled in ArcMAP from spatial data gathered from the Hopewell Culture National Historical Park GIS Database (courtesy of Bret Ruby), the U.S. Census Bureau, the State of Ohio Department of Transportation, the National Fish and Wildlife Service, and the FEMA. New spatial data layers were created or modified by the consultant to depict conditions at Seip Earthworks at the time of the site visit in October, 2014. To facilitate accurate mapping, all existing layers were projected to a consistent projected coordinate system (NAD_1983_UTM_Zone_17N) prior to production of new data. Process and rationale for the existing conditions layers is described below.

- Unit Boundary: Data provided by park in Ruby geodatabase

- Property not in NPS ownership: Layer created by consultant based on boundary and tract data provided by park in Ruby geodatabase.

- Existing roads (outside park boundary): Spatial data from State of Ohio Location Based Response System road centerlines.

- Existing roads and trails (within park boundary): Layer created by consultant based on Google Maps aerial photograph and consultant field observation, October 2014.

- Waterbodies: Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- Floodplain: Spatial data from FEMA National Flood Hazard Layer.

- Wetlands: Spatial data from http://www.fws.gov/wetlands/Data/Mapper.html.

- Contours: One foot interval contours developed by consulting team from digital elevation model provided by park.

- Earthworks: Spatial data for the Central Mound and the Conjoined Mound provided by park in Ruby geodatabase.

- Spatial data for the Large Circle, Small Circle, and Large Square was developed by the consultant based on GIS HOCU 2012 LiDAR imagery, Seip Marshall NAD83 and Squier and Davis, 1846. All additional features which were not visible on the magnetometer, lidar, or historic aerial photograph were traced from Squier and Davis, 1846. As the georectified Squier and Davis plan does not align precisely with existing site conditions, the placement of these features is the least geographically accurate, and their location is indicated on the plan as "Unverified." Features indicated as "Unverified" on the existing conditions plan should not be used as a definitive location for the earthworks.

- Buildings and Structures: Spatial data developed by the consultant based on 2014 aerial photographs and verified at the October 2014 site visit.

- Overhead Lines: Spatial data developed by the consultant based on 2014 aerial photographs and verified at the October 2014 site visit.

- Vegetation: Spatial data modified by the consultant from the data provided by the park of the 2014 vegetation survey. The 2104 vegetation survey data was clipped to the current park boundary and modified based on field observations at the October 2014 site visit and 2014 aerial photographs.

- Trees: GPS data gathered at the time of the site visit in October, 2014

- Fences: Spatial data developed by the consultant based on HOCU CAD drawing ccimow.dwg and verified at the October 2014 site visit.

High Bank Works

Spatial Data and Rationale

Preparation of the High Bank Works existing conditions plan was completed in ESRI ArcMAP 10.2, AutoCAD 2013 and Adobe Illustrator. A basemap of the project area was assembled in ArcMAP from spatial data gathered from the Hopewell Culture National Historical Park GIS Database (courtesy of Bret Ruby), the U.S. Census Bureau, the State of Ohio Department of Transportation, the National Fish and Wildlife Service, and the FEMA. New spatial data layers were created or modified by the consultant to depict conditions at High Bank Works at the time of the site visit in October, 2014. To facilitate accurate mapping, all existing layers were projected to a consistent projected coordinate system (NAD_1983_UTM_Zone_17N) prior to production of new data. Process and rationale for the existing conditions layers is described below.

- Unit Boundary: Data provided by park in Ruby geodatabase

- Property not in NPS ownership: Layer created by consultant based on boundary and tract data provided by park in Ruby geodatabase.

- Existing roads (outside park boundary): Spatial data from State of Ohio Location Based Response System road centerlines.

- Existing roads and trails (within park boundary): Layer created by consultant based on Google Maps aerial photograph and consultant field observation, October 2014.

- Waterbodies: Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- Floodplain: Spatial data from FEMA Floodplains Map #39141C0375D.

- Wetlands: Spatial data from http://www.fws.gov/wetlands/Data/Mapper.html.

- Railroad: Spatial data from U.S. Census Bureau's Master Address File / Topographically Integrated Geographic Encoding and Referencing Database.

- Contours: One foot interval contours developed by consulting team from digital elevation model provided by park.

- Earthworks: Spatial data was developed by the consultant based on Lidar, magnetometer, historic aerial photographs, and historic surveys. The consultant referenced Page 68 from Burks 2013 High Bank Works Magnetic Survey, Page 47/48 from Burks 2013 Turpen Tract-High Bank Works Magnetic Survey. Then the consultant referenced GIS HOCU 2012 LiDAR imagery High_Bank.jpg, to finish referencing mounds and portion of mounds that were not included in the Magnetic Survey. The magnetometer surveys covered the area of the large circle enclosure, the large square enclosure, and an area southwest of the square enclosure south of the earthen causeway. All earthworks traced from the survey are coded on the plan as "known." Sections of earthworks that were recorded by the as visible on the site at the October 2014 site visit are coded on the plan as "known extant," while sections of earthworks that are only visible on the magnetometer scan are identified as "known below grade." Magnetometer scan data was most effective to identify the location of the Great Circle, the 250' Circle and Octagon enclosures, however,

the Parallel Walls were not visible on the scan or Lidar, or not within the area recorded by the scan. These features were traced from Squier and Davis, 1846. As the georectified Squier and Davis plan does not align precisely with existing site conditions, the placement of these features is the least geographically accurate, and their location is indicated on the plan as "Unverified." Features indicated as "Unverified" on the existing conditions plan should not be used as a definitive location for the earthworks.

- Buildings and Structures: Spatial data developed by the consultant based on 2014 Google Maps aerial photographs and verified at the October 2014 site visit.

- Overhead Lines: Spatial data developed by the consultant based on 2014 aerial photographs and verified at the October 2014 site visit.

- Vegetation: Spatial data modified by the consultant from the data provided by the park of the 2014 vegetation survey. The 2014 vegetation survey data was clipped to the current park boundary and modified based on field observations at the October 2014 site visit and 2014 aerial photographs.

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Appendix F: Consultation / Coordination Documents

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

Dr. Mary Knapp
Field Supervisor
Ohio Field Office
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230

Dear Dr. Knapp,

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Federally Listed Threatened and Endangered Species

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). The park consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

(1) Mound City Group	327324E, 4360420N
(2) Hopeton Earthworks	329544E, 4361421N
(3) Hopewell Mound Group	319711E, 4358965N
(4) Seip Earthworks	308325E, 4345356N
(5) High Bank Earthworks	334650E, 4351240N
(6) Spruce Hill Works	315650E, 4349550N

The sites include a mixture of deciduous hardwood forests; riparian zones; cultivated fields; native and non-native meadows; and developed areas with roads, trails, and visitor facilities.

The primary objective of the CLR/EA is the preservation and maintenance of the HOCU cultural landscape, with a focus on establishing a stable vegetative cover with appropriate and compatible visitor amenities at each of the six units. In addition to a no action alternative, the CLR/EA will evaluate a number of action alternatives to provide for the long-term stewardship of the HOCU cultural landscape, with specific recommendations for preservation, repair, or improvements for extant features including vegetation and views. The action alternatives will likely include a mix of rehabilitating and preserving

cultural landscape features, which may include activities that would disturb existing vegetation, such as converting portions of existing forested areas into mowed fields or native grass meadows.

Section 7 of the Endangered Species Act of 1973 requires that a federal agency consult with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service on any action that may affect endangered, threatened, or candidate species or that may result in adverse modification of critical habitat. As part of the EA analysis, NPS reviewed the most current list of federally listed species that may occur in Ross County, Ohio, the county in which the study area is located.

The USFWS Ohio Field Office website identifies the following species as potentially being present in Ross County, Ohio:

Species	Federal Status
Bald Eagle (*Haliaeetus leucocephalus*)	BGEPA
Indiana Bat (*Myotis sodalis*)	LE
Clubshell Mussel (*Pleurobema clava*)	LE
Northern Riffleshell (*Epioblasma torulosa rangiana*)	LE
Rayed Bean Mussel (*Villosa fabalis*)	LE
Eastern hellbender (*Cryptobranchus alleganiensis alleganiensis* (Daudin))	SC
Timber Rattlesnake (*Crotalus horridus*)	SC

LT = Listed threatened, LE = Listed Endangered, SC = Species of Concern.

No federally listed species are documented for the park, but the park lies within habitat range of federally protected bald eagle and Indiana bat. Additionally, although not currently listed, northern long-eared bat (*Myotis septentrionalis*) is a candidate species proposed for listing that has been documented in the park. Section 7(a)(4) of the ESA states, "Each Federal agency shall confer with the Secretary on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed or result in the destruction or adverse modification of critical habitat proposed to be designated for such species." Therefore, NPS proposes that this species be added to the above list.

This letter constitutes initiation of informal consultation under section 7(c) of the Endangered Species Act for the HOCU CLR/EA. We would appreciate it if you would confirm the list of species that should be addressed in the CLR/EA. Once prepared, we will provide you with a draft of the CLR/EA with NPS' preliminary effects determination and proposed mitigation, if any, for your review and concurrence.

Please respond to Bret J. Ruby, PhD, Chief of Resource Management, at (740) 774-1126 if you have any questions or concerns about this request, or if you require additional information. This letter will serve as a record that the NPS is initiating informal consultation with your agency pursuant to the requirements of the 1973 Endangered Species Act, as amended and 2006 *NPS Management Policies*.

We appreciate your continuing assistance with National Park Service projects.

Sincerely,

Dean Alexander
Superintendent

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

Mr. Burt Logan
State Historic Preservation Officer
800 E. 17th Ave.
Columbus, OH 43211-2474

Reference: Hopewell Culture National Historic Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Mr. Logan,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historic Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). The park consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

(1) Mound City Group	327324E, 4360420N
(2) Hopeton Earthworks	329544E, 4361421N
(3) Hopewell Mound Group	319711E, 4358965N
(4) Seip Earthworks	308325E, 4345356N
(5) High Bank Earthworks	334650E, 4351240N
(6) Spruce Hill Works	315650E, 4349550N

The sites include a mixture of deciduous hardwood forests; cultivated fields; native and non-native meadows; and developed areas with roads, trails, and visitor facilities.

In addition to a no action alternative, the CLR/EA will evaluate a number of action alternatives to provide for the long-term stewardship of the HOCU cultural landscape, with specific recommendations for preservation, repair, or improvements for extant features including vegetation and views. The action alternatives will likely include a mix of rehabilitating and preserving cultural landscape features, which may include activities that would disturb existing vegetation, such as converting portions of existing forested areas into mowed fields or native grass meadows.

The primary objective of the CLR/EA is the preservation and maintenance of the HOCU cultural landscape, with a focus on establishing a stable vegetative cover with appropriate and compatible visitor amenities at each of the five units.

While NPS will complete and submit Section 106 Review Project Summary Form, this letter serves as a record that the NPS is initiating informal consultation with your agency pursuant to the requirements of 36 CFR 800.2.c.1 and 2006 *NPS Management Policies*.

We are consulting with the following Indian tribes regarding the CLR/EA: the Absentee Shawnee Tribe of Indians of Oklahoma; the Delaware Nation; the Delaware Tribe of Indians; the Eastern Shawnee Tribe of Oklahoma; the Miami Tribe of Oklahoma; the Ottawa Tribe of Oklahoma; the Seneca-Cayuga Tribe of Oklahoma; the Shawnee Tribe; and the Wyandotte Nation.

We are currently preparing an initial draft, and will forward this to you for review and comment when it is available. Please respond to Bret J. Ruby, PhD, Chief of Resource Management, at (740) 774-1126 if you have any questions or concerns about this project, or if you require additional information.

We appreciate your continuing assistance with National Park Service projects.

Sincerely,

Dean Alexander
Superintendent

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Billy Friend
Chief, Wyandotte Nation
64700 E. Highway 60
Wyandotte, OK 74370

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Chief Friend,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

(1) Mound City Group	327324E, 4360420N
(2) Hopeton Earthworks	329544E, 4361421N
(3) Hopewell Mound Group	319711E, 4358965N
(4) Seip Earthworks	308325E, 4345356N
(5) High Bank Earthworks	334650E, 4351240N
(6) Spruce Hill Works	315650E, 4349550N

The sites include a mixture of deciduous hardwood forests; cultivated fields; native and non-native meadows; and developed areas with roads, trails, and visitor facilities.

In addition to a no action alternative, the CLR/EA will evaluate a number of action alternatives to provide for the long-term stewardship of the HOCU cultural landscape, with specific recommendations for preservation, repair, or improvements for extant features including vegetation and views. The action alternatives will likely include a mix of rehabilitating and preserving cultural landscape features, which may include activities that would disturb existing vegetation, such as converting portions of existing forested areas into mowed fields or native grass meadows.

The primary objective of the CLR/EA is the preservation and maintenance of the HOCU cultural landscape, with a focus on establishing a stable vegetative cover with appropriate and compatible visitor amenities at each of the six units. This letter serves as a record that the NPS is initiating consultation with your government pursuant to the requirements of the National Historic Preservation Act (36 CFR 800.2.c.2) and 2006 *NPS Management Policies*.

We are consulting with the following Indian tribes regarding the CLR/EA: the Absentee Shawnee Tribe of Indians of Oklahoma; the Delaware Nation; the Delaware Tribe of Indians; the Eastern Shawnee Tribe of Oklahoma; the Miami Tribe of Oklahoma; the Ottawa Tribe of Oklahoma; the Seneca-Cayuga Tribe of Oklahoma; the Shawnee Tribe; and the Wyandotte Nation. We are also consulting with the Ohio State Historic Preservation Officer.

We are currently preparing an initial draft, and will forward this to you for review and comment when it is available. Please respond to Bret J. Ruby, PhD, Chief of Resource Management, at (740) 774-1126 if you have any questions or concerns about this project, or if you require additional information.

We appreciate your continuing assistance with National Park Service projects.

Sincerely,

Dean Alexander
Superintendent

cc: Ms. Sherri Clemons, Tribal Historic Preservation Officer, Wyandotte Nation

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable William Fisher
Chief, Seneca-Cayuga Tribe of Oklahoma
23701 South 655 Rd
Grove, OK 74344

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Chief Fisher,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

(1) Mound City Group	327324E, 4360420N
(2) Hopeton Earthworks	329544E, 4361421N
(3) Hopewell Mound Group	319711E, 4358965N
(4) Seip Earthworks	308325E, 4345356N
(5) High Bank Earthworks	334650E, 4351240N
(6) Spruce Hill Works	315650E, 4349550N

The sites include a mixture of deciduous hardwood forests; cultivated fields; native and non-native meadows; and developed areas with roads, trails, and visitor facilities.

In addition to a no action alternative, the CLR/EA will evaluate a number of action alternatives to provide for the long-term stewardship of the HOCU cultural landscape, with specific recommendations for preservation, repair, or improvements for extant features including vegetation and views. The action alternatives will likely include a mix of rehabilitating and preserving cultural landscape features, which may include activities that would disturb existing vegetation, such as converting portions of existing forested areas into mowed fields or native grass meadows.

The primary objective of the CLR/EA is the preservation and maintenance of the HOCU cultural landscape, with a focus on establishing a stable vegetative cover with appropriate and compatible visitor amenities at each of the six units. This letter serves as a record that the NPS is initiating consultation with your government pursuant to the requirements of the National Historic Preservation Act (36 CFR 800.2.c.2) and 2006 *NPS Management Policies*.

We are consulting with the following Indian tribes regarding the CLR/EA: the Absentee Shawnee Tribe of Indians of Oklahoma; the Delaware Nation; the Delaware Tribe of Indians; the Eastern Shawnee Tribe of Oklahoma; the Miami Tribe of Oklahoma; the Ottawa Tribe of Oklahoma; the Seneca-Cayuga Tribe of Oklahoma; the Shawnee Tribe; and the Wyandotte Nation. We are also consulting with the Ohio State Historic Preservation Officer.

We are currently preparing an initial draft, and will forward this to you for review and comment when it is available. Please respond to Bret J. Ruby, PhD, Chief of Resource Management, at (740) 774-1126 if you have any questions or concerns about this project, or if you require additional information.

We appreciate your continuing assistance with National Park Service projects.

Sincerely,

Dean Alexander
Superintendent

cc: Mr. Paul Barton, Tribal Historic Preservation Officer, Seneca-Cayuga Tribe of Oklahoma

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Ethel Cook
Chief, Ottawa Tribe of Oklahoma
P.O. Box 110
Miami, OK 74355

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Chief Cook,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

(1) Mound City Group	327324E, 4360420N
(2) Hopeton Earthworks	329544E, 4361421N
(3) Hopewell Mound Group	319711E, 4358965N
(4) Seip Earthworks	308325E, 4345356N
(5) High Bank Earthworks	334650E, 4351240N
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We appreciate your continuing assistance with National Park Service projects.

Sincerely,

Dean Alexander
Superintendent

cc: Ms. Rhonda Dixon; History, Archives, Library; Ottawa Tribe of Oklahoma

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Douglas G. Lankford
Chief, Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Chief Lankford,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

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Sincerely,

Dean Alexander
Superintendent

cc: Mr. George Strack, Tribal Historic Preservation Officer, Miami Tribe of Oklahoma
Ms. Julie Olds, Cultural Resources Officer, Miami Tribe of Oklahoma

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Chester "Chet" Brooks
Chief, Delaware Tribe of Indians
170 NE Barbara
Bartlesville, OK 74006

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Chief Brooks,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

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Sincerely,

Dean Alexander
Superintendent

cc: Dr. Brice Obermeyer, Director, Delaware Tribe Historic Preservation Office

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Clifford Peacock
President, Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear President Peacock,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

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Sincerely,

Dean Alexander
Superintendent

cc: Ms. Nekole Alligood, Cultural Preservation Director, Delaware Nation
Mr. Jason Ross, Section 106 Manager, Delaware Nation

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Ron Sparkman
Chief, Shawnee Tribe
P.O. Box 189
29 South Highway 69A
Miami, OK 74355

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Chief Sparkman,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

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Dean Alexander
Superintendent

cc: Mr. Ben Barnes, 2nd Chief, Shawnee Tribe
Mr. Roy Baldridge, Treasurer, Shawnee Tribe

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Glenna J. Wallace
Chief, Eastern Shawnee Tribe of Oklahoma
P.O. Box 350
Seneca, MO 64865

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Chief Wallace,

The National Park Service (NPS) is preparing a Cultural Landscape Report and associated Environmental Assessment (CLR/EA) to support management decisions on treatment and use of aboveground cultural landscape resources for the Hopewell Culture National Historical Park (HOCU or park) to achieve desired resource conditions and visitor experiences as identified in HOCU's 1997 General Management Plan (GMP). The primary resources for which the park was established are the monumental prehistoric geometric earthworks and mounds built by the American Indian Hopewell culture (A.D. 1 - 400). HOCU consists of six discrete sites that encompass 1828 acres in Ross County in south-central Ohio in the vicinity of Chillicothe, Ohio (map attached). The approximate UTM coordinates of the sites are (NAD 1983 UTM Zone 17N):

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Sincerely,

Dean Alexander
Superintendent

cc: Ms. Robin Dushane, Cultural Preservation Director, Eastern Shawnee Tribe of Oklahoma

Attachment

United States Department of the Interior

NATIONAL PARK SERVICE
Hopewell Culture National Historical Park
16062 State Route 104
Chillicothe, Ohio 45601

IN REPLY REFER TO

5.3 HOCU CLR/EA

February 4, 2015

The Honorable Edwina Butler-Wolfe
Governor, Absentee-Shawnee Tribe of Indians of Oklahoma
2025 South Gordon Cooper
Shawnee Oklahoma 74801

Reference: Hopewell Culture National Historical Park – Cultural Landscape Report and Environmental Assessment

Subject: Request to Initiate Section 106 Consultation

Dear Governor Butler-Wolfe,

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Sincerely,

Dean Alexander
Superintendent

cc: Mr. Joseph H. Blanchard, Cultural Preservation Director/Tribal Historic Preservation Officer

Attachment


Hopeton Earthworks
Mound City Group
Hopewell Mound Group
Seip Earthworks
Spruce Hill
High Bank Works
35
608
114
104
159
23
50
772
167
172
921
900
0
3000
6000
JANUARY 2015
UNITED STATES DEPARTMENT OF THE INTERIOR
HOPEWELL CULTURE NATIONAL HISTORICAL PARK
TITLE OF PROJECT
CULTURAL LANDSCAPE REPORT AND ENVIRONMENTAL ASSESSMENT
TITLE OF DRAWING
PARK EARTHWORK LOCATIONS
NAME OF PARK
HOPEWELL CULTURE NATIONAL HISTORICAL PARK
REGION MIDWEST
COUNTY ROSS
STATE OHIO

Appendix G: FMSS

FMSS (NOT INCLUDED PUBLIC REVIEW SUBMITTAL)

Appendix H: Seed Mixes

The following is based on USDA and NRCS, Ohio 2010 Seed Mix Calculator.[1] Native species with a higher diversity mix are preferred, however the preferred seed mix should be based upon current scholarship and intended use. The following seed mixes are based on current knowledge and can be changed as scholarship evolves.

Seed Reference Data		
Seed	**Seeds / Lb (x1000)**	**Average Cost /Lb.**
Native Grasses		
Big Blue Stem (Andropogon gerardii)	140	$13.19
Side Oats Grama (Bouteloua curtipendula)	190	$14.66
Canada Wild Rye (Elymus canadensis)	115	$10.58
Virginia Wild Rye (Elymus virginicus)	75	$9.16
Switchgrass (Blackwell) (Panicum virgatum)	370	$10.73
Little Blue Stem (Schizachyrium scoparium)	225	$15.37
Prairie Dropseed (Sporobulus heterolepis)	1200	$185.00
Eastern Gamagrass (Tripsacum dactyloides)	7	$14.25
Purple Top (Tridens flavus)	5000	$28.95
Sand Dropseed (Sporobulus cryptandrus)	5600	$7.50
Indiangrass (Tomahawk or NE 54) (Sorghastrum nutans)	175	$11.89
Introduced Perennial Grasses		
Festulolium	227	$4.52
Garrison Grass (Alopecurus arundinaceus)	750	$7.13

1 USDA and NRCS, Ohio 2010 Seed Mix Calculator, developed by Mark A. Scarpitii, CCA, State Agronomist, Ohio NRCS.

Seed Reference Data		
Seed	**Seeds / Lb (x1000)**	**Average Cost /Lb.**
Kentucky Bluegrass (Poa pratensis)	2200	$2.94
Orchard Grass (Dactylis glomerata)	590	$4.00
Perennial Ryegrass (Lolium Perenne L.)	237	$1.69
Reed Canarygrass (Phalaris arundinacea L.)	550	$4.31
Smooth Bromegrass (Bromus inermis)	137	$2.73
Creeping Red Fescue (Festuca rubra)	615	$4.72
Red Top (Agrostis palustris)	5000	$10.25
Tall Fescue (Festuca arundinacea)	230	$1.52
Timothy (Phleum pratense L.)	1230	$1.87
		$4.15
Introduced Legumes		
Alfalfa (Medicago sativa)	210	$4.37
Alsike Clover (Trifolium hybridum)	700	$1.96
Austrian Winter Pea (Lathyrus hirsutus)	18	$1.05
Birdsfoot Trefoil (Lotus corniculatus)	375	$6.65
Crimson Clover (Trifolium incarnatum)	140	$2.85
Red Clover (Trifolium pratense)	275	$3.88
Ladino Clover (Trifolium repens)	860	$4.56
Lespedeza, Annual (Kummerowia stipulacea)	240	$3.35
Lespedeza, Sericea - AU-Grazer (Lespedeza cuneata)	350	$4.00

Seed Reference Data		
Seed	**Seeds / Lb (x1000)**	**Average Cost /Lb.**
Hairy Vetch (Vicia villosa)	20	$3.03
Crownvetch (Coronilla varia)	140	$15.82
Native Legumes		
Canadian Milk Vetch (Astragalus canadensis)	120	$76.17
Prairie False Indigo (Baptisia leucantha)	27	$80.00
Partidge Pea (Chamaecrista fasciculata)	50	$15.36
Wild Senna (Cassia hebecarpa)	23	$67.50
Canada Tick-Trefoil (Desmodium canadense)	88	$102.75
Round-Headed Bush Clover (Lespedeza capitata)	128	$135.50
Slender Bush Clover (Lespedeza virginica)	160	$71.00
Purple Prairieclover (Dalea purpurea)	317	$78.33
Native Forbs		
Nodding Wild Onion (Allium cernuum)	138	$126.83
Swamp Milkweed (Asclepias incarnata)	102	$232.00
Butterfly Milkweed (Asclepias tuberosa)	70	$203.18
Smooth Aster (Aster laevis)	17	$187.13
New England Aster (Aster novae-angliae)	1100	$227.50
White Wild Indigo (Baptisia lactea)	25	$121.75

Seed Reference Data		
Seed	**Seeds / Lb (x1000)**	**Average Cost /Lb.**
Nodding Sticktight (Bidens cernua)	130	$108.00
Illinois Bundleflower (Desmanthus illinoensis)	60	$25.32
Purple Coneflower (Echinacea purpurea)	115	$39.40
Sneezeweed (Helenium autumnale)	1603	$119.04
Sawtooth Sunflower (Helianthus grosseserratus)	630	$440.00
Western Sunflower (Helianthus occidentalis)	207	$292.50
Smooth Oxeye (False) Sunflower (Heliopsis helianthoides)	104	$47.25
Rough Blazing-Star (Liatris aspera)	191	$364.08
Dense Blazing-Star (Liatris spicata)	135	$121.48
Lupine (Lupinus perennis L.)	18	$208.79
Wild Bergamot (Monarda fistulosa)	1200	$137.01
Virginia Mountain Mint (Pycanthemum virginianum)	6048	$447.00
Gray-Headed Coneflower (Ratibida pinnata)	625	$47.13
Pasture Rose (Rosa carolina)	50	$272.50
Black-eyed Susan (Rudbeckia hirta)	1500	$29.06
Cup Plant (Silphium perfoliatum)	34	$112.97
Prairie Dock (Silphium terebinthinaceum)	18	$271.83
Stiff Goldenrod (Solidago rigida)	656	$134.63
Showy Goldenrod (Solidago speciosa)	1675	$179.50
Ohio Spiderwort (Tradescantia ohioensis)	128	$261.58

Seed Reference Data		
Seed	**Seeds / Lb (x1000)**	**Average Cost /Lb.**
Blue Vervain (Verbena hastata)	1793	$85.60
Western Ironweed (Vernonia fasciculata)	373	$164.00
Golden Alexanders (Zizia aurea)	176	$144.71
Common Evening Primrose (Oenothera biennis)	50	$93.85
Culvers Root (Veronicastrum virginicum)	50	$229.41
Prairie Cirquefoil (Prairie Cirquefoil)	14	$145.83
Prairie Coreopsis (Coreopsis Palmata)	551	$147.50
Leadplant (Amorpha Canescens)	277	$130.93
Compass Plant (Silphium Laciniatum)	12	$129.67
Cardinal Flower (Lobelia Cardinalis)	15	$730.40
Rattlesnake Master (Eryngium Aquaticum)	252	$111.11
Lanceleaf Coreopsis (Coreopsis Lanceolata)	559	$34.01
Upright Coneflower (Ratibida Columnifera)	600	$31.33
Royal Catchfly (Silene regia)	370	$1,035.00
Cover Crops - Grasses (Additional Grasses Above)		
Rygrass, Annual (Lolium multiflorum)	228	$0.95
Sorghum/Sudan Grass (Sorghum bicolor (L.) Moench)	28	$1.45
Tiffany Teff Grass	1300	$3.30
		$1.90

Seed Mix Used at High Bank Works, 2010

Seed Mix	Input Seeding Rate lbs / ac	Seeds per lb x 1000	Seeds per sq ft. @ Seeding Rate	Price Per Pound	Cost in Mix	Percent of Total Cost of Mix
Big Blue Stem (Andropogon gerardii)	0.6	140	2	$13.19	$7.92	6.3%
Little Blue Stem (Schizachyrium scoparium)	1.5	225	8	$15.37	$23.06	18.3%
Indiangrass (Tomahawk or NE 54) (Sorghastrum nutans)	0.5	175	2	$11.89	$5.94	4.7%
Sand Dropseed (Sporobulus cryptandrus)	0.02	5600	3	$7.50	$0.15	0.1%
Side Oats Grama (Bouteloua curtipendula)	1.3	190	6	$14.66	$19.05	15.1%
Select A Seed	0	0	0	$0.00	$0.00	0.0%
Black-eyed Susan (Rudbeckia hirta)	0.1	1500	3	$29.06	$2.91	2.3%
Gray-Headed Coneflower (Ratibida pinnata)	0.12	625	2	$47.13	$5.66	4.5%
New England Aster (Aster novae-angliae)	0.02	1100	1	$227.50	$4.55	3.6%
Illinois Bundleflower (Desmanthus illinoensis)	0.2	60	0	$25.32	$5.06	4.0%
Lanceleaf Coreopsis (Coreopsis Lanceolata)	0.1	559	1	$34.01	$3.40	2.7%
Partidge Pea (Chamaecrista fasciculata)	0.4	50	0	$15.36	$6.15	4.9%
Purple Coneflower (Echinacea purpurea)	0.15	115	0	$39.40	$5.91	4.7%
Purple Prairieclover (Dalea purpurea)	0.1	317	1	$78.33	$7.83	6.2%
Upright Coneflower (Ratibida Columnifera)	0.1	600	1	$31.33	$3.13	2.5%
Sneezeweed (Helenium autumnale)	0.03	1603	1	$119.04	$3.57	2.8%
Smooth Oxeye (False) Sunflower (Heliopsis helianthoides)	0.1	104	0	$47.25	$4.73	3.7%
Wild Bergamot (Monarda fistulosa)	0.07	1200	2	$137.01	$9.59	7.6%
Select A Seed	0	0	0	$0.00	$0.00	0.0%
Butterfly Milkweed (Asclepias tuberosa)	0.01	70	0	$203.18	$2.03	1.6%
Stiff Goldenrod (Solidago rigida)	0.04	656	1	$134.63	$5.39	4.3%
Totals	lbs/ac		Seeds per sq ft.		Cost of Mix	Total Percent
	5.46		34.0		$126.02	*100.0%*

Cultural Landscape Report and Environmental Assessment

Hopewell Culture National Historical Park
Chillicothe, Ohio

2016