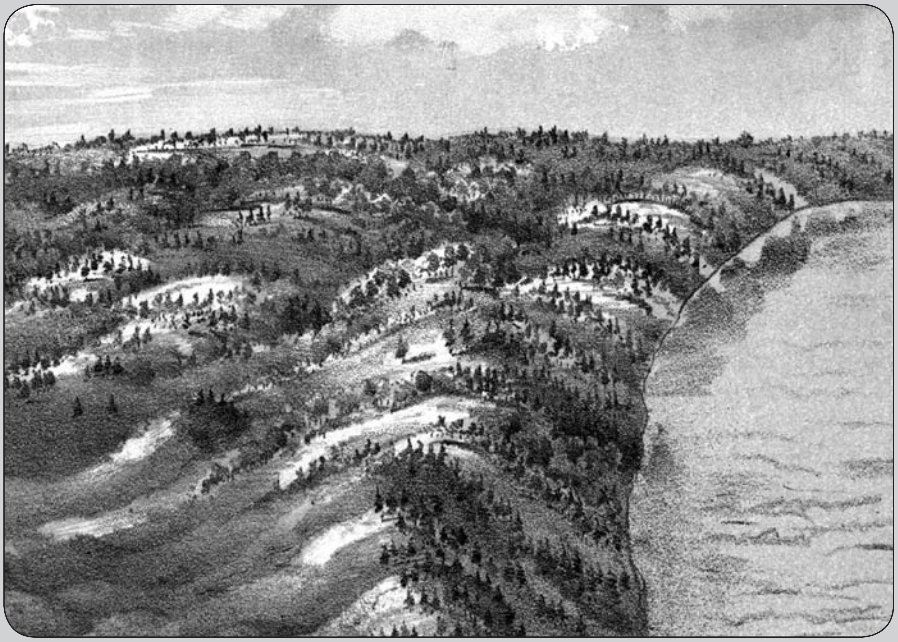
An Archeological Overview and Assessment of Indiana Dunes National Lakeshore, Indiana

By
Dawn Bringelson
and
Jay T. Sturdevant

Midwest Archeological Center
Technical Report No. 97



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Available

Making the report available meets the criteria of 43CFR Part 7, Subpart A, Section 7.18 (a) (1).

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United States Department of the Interior
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INDIANA DUNES NATIONAL LAKESHORE

ABSTRACT

The Indiana Dunes area along the southern Lake Michigan shore holds a unique and unsurpassed set of natural resources. The exceptional nature of this area's topography and resulting biological diversity attracted the attention of scientific and conservation communities by the turn of the 20th century. This appreciation, coupled with severe and ongoing impact by industry to the southern Lake Michigan dunes, sparked activism that ultimately contributed to the formation of Indiana Dunes National Lakeshore (INDU) at the end of the 1960s. Today, INDU contains most of the last remaining intact duneland of the larger area. Archeological investigations of the dunes area, starting with avocational observations some 100 years ago, have intensified over recent decades as a result of park activities and research. Information about the archeological record at INDU derives from a wide variety of circumstances, including intensive and systematic inventory, testing and data recovery projects, but also from incidental discoveries and numerous monitoring projects. Data indicate that human use of the INDU area has occurred over much of the last 10,000 years. Archeological materials are distributed across INDU and suggest that some areas in the park were occupied and reoccupied over thousands of years. The intact topography at INDU offers a rare opportunity to learn more about prehistoric and historic land use and cultural relations around Lake Michigan and the mid-continent.

ACKNOWLEDGEMENTS

This project has benefited greatly from the assistance of many individuals and several organizations. First and foremost, the staff of Indiana Dunes National Lakeshore have given their unwavering support for and interest in the development of knowledge about the archeological record. Without this, much of the information used within the following document would not have been available. Thanks especially to former Superintendent Dale Engquist, Assistant Superintendent Garry Traynham, Landscape Architect Eric Ehn, Historian Janice Slupski, Resource Manager Bob Daum, and Historic Architect Judy Collins for the commitment and partnering spirit they have fostered through the years.

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1. INTRODUCTION

The Indiana Dunes National Lakeshore (INDU) was formally designated as a unit of the National Park Service by Congress in 1966, after years of struggle to preserve some portion of the south shore of Lake Michigan from the impinging industrialization of the shoreline between Chicago, Illinois, and Michigan City, Indiana. The Lakeshore consists of five non-contiguous parcels of land comprising approximately 15,000 acres along a 25-mile stretch of U.S. Highway 12 (Figure 1). Indiana's Dunes State Park, covering about 2000 acres, is situated within the East Unit of INDU. Both the federal and state parks are interspersed with private-use areas. These include the communities of Dune Acres, Ogden Dunes, and Beverly Shores, as well as a dwindling number of Reservation of Use and Occupancy (ROU) single-family dwellings. The number of these dwellings has decreased markedly over the past 10 years, as ROU leases have expired and INDU has worked to reclaim the sites to natural habitat. The ROU program is explained below.

This Archeological Overview and Assessment provides a synthesis of information relevant to archeological resources in the park, for purposes of planning, education, and research. The target audience for this document includes park managers, ranger staff and interpreters, as well as professionals and students in the archeological community. It summarizes environmental and cultural history of the northwest Indiana area, and the history of the archeological research in and around the Lakeshore itself. Work on this document started with a regional and park-specific literature review, using documents relevant to archeological projects performed or planned at INDU, as well as readings concerning archeology in the southern Lake Michigan region. Several data tables were constructed from these materials, compiling bibliographic information, park project history information, data concerning regional research outside the park, archeological sites within the park, and information on collections and archives. Gathering of these data prompted certain questions and guided the direction of the research phase of the Overview and Assessment. Topics pursued during the course of this project include the relationship of INDU's unique geological and biotic complement to its cultural history, the relationship of this southern Lake Michigan area to regional prehistoric trends, and ways to improve our understanding of past human relationships with the Indiana Dunes area.

Chapter 2 outlines the geologic history of the area and the formation of the Indiana Dunes environment relevant to its special assemblage of topographic and biotic resources, as well as the role these played in the political history of the Lakeshore's status as a unit of the NPS. These resources also played a major role in how people used this area prior to the 20th century. Chapter 3 outlines the culture history of the southern Lake Michigan region through the Holocene, focusing on the Indiana Dunes area. Chapter 4 presents the history of archeological research in and around the Lakeshore, and examines the unique environmental setting here relative to developing an understanding of past human use and occupation. Compiling research starting with avocational and cursory archeological efforts to detailed listing of NPS-initiated investigations, this chapter demonstrates the extent and depth of investigation of human occupation and use of the Lakeshore area. Chapter 5 combines all these lines of evidence to examine patterns of site distribution through time at INDU, and to start to integrate knowledge of prehistory here with that of the surrounding areas. The role of the Lakeshore in regional cultural systems during later prehistory dominates this discussion, as this chapter examines issues integral to larger questions regarding the Late Woodland-Upper Mississippian dichotomy in the Upper Midwest. This chapter also discusses the role of the Lakeshore in settlement and subsistence systems. Finally, Chapter 6 offers assessments and recommendations for the future of archeological work at INDU. Recommendations for improving on our knowledge of distribution of resources include augmentation of the GIS (Geographic Information System) database with existing data, as well as adding depth to our understanding of previously located sites through subsurface testing. Finally, recommendations are offered for interpreting the past for visitors and other interested parties.

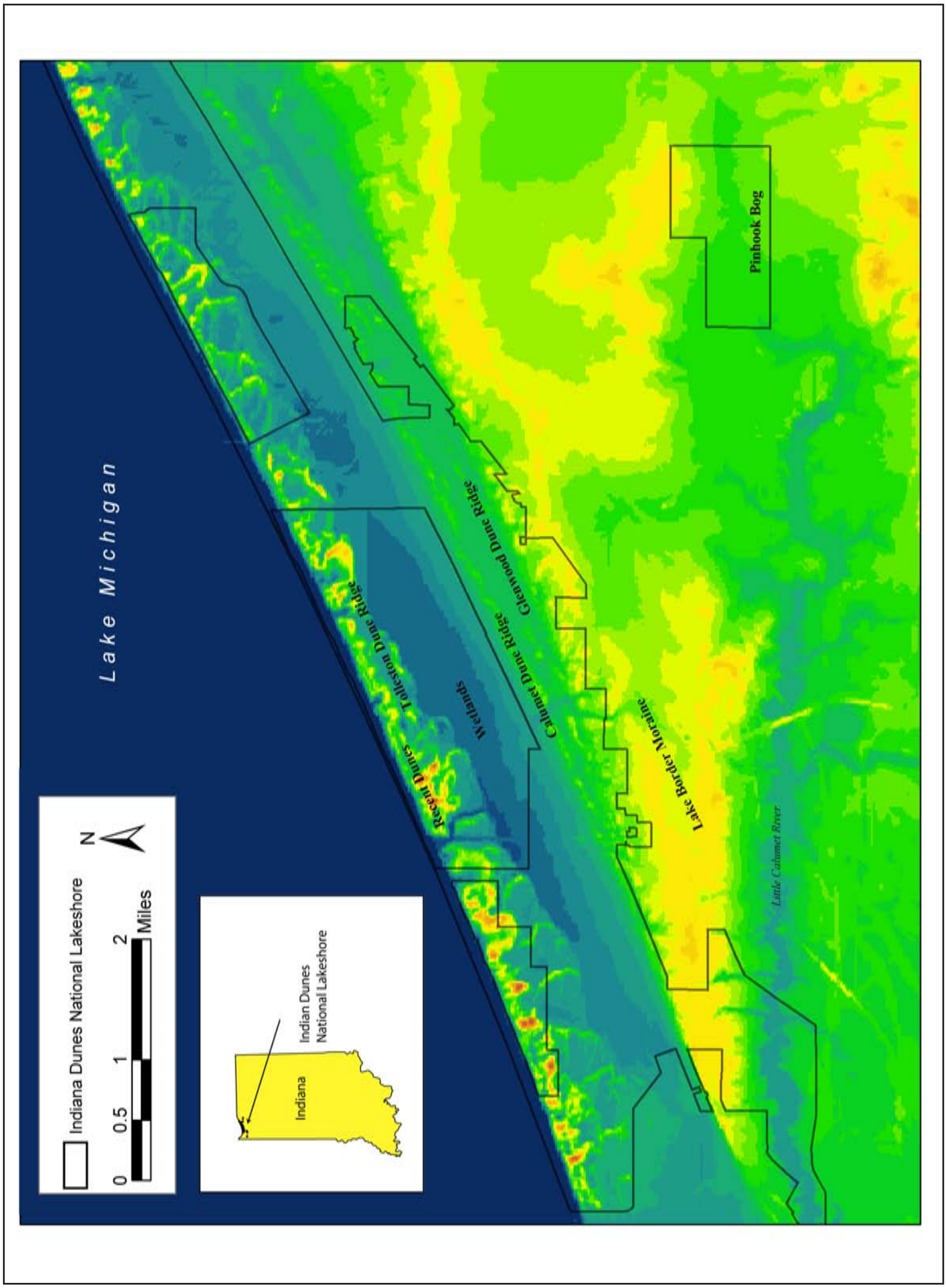

Figure 1. Modern dune ridges and other landforms in the INDU area, shown on Digital Elevation Model (DEM).

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2. ENVIRONMENT AND RESOURCES

The story of the Indiana Dunes begins thousands of years ago, with the development of a unique set of resources. This chapter summarizes this region's natural history, beginning with Quaternary geology, followed by consideration of climatic change and vegetation history, and finally considering how the natural environment has shaped the cultural and political history of the area.

Quaternary Geology and Physiography

The Quaternary Period consists of two epochs: the Pleistocene and the Holocene. The Pleistocene spanned from about one million to approximately 12 thousand years ago. This epoch is characterized by a time of climatic fluctuation, with low global temperatures (relative to today) resulting in glacial build-up and advance, interspersed with times of warmer global temperatures and glacial retreats. The Holocene, or present epoch, is characterized by warmer temperatures and sustained retreat of the world's glaciers. This time period, being only 12 to 14 thousand years in length, is brief from a geological perspective (and may in fact represent merely an inter-glacial stage of the Pleistocene Epoch), but represents a significant parcel of time in terms of archeology, as it has witnessed important changes in topography and resources that ultimately influenced human use of this area.

Dune Ridge Formation

An understanding of Holocene environmental changes rests upon Pleistocene formation processes on a massive scale, as glacial action formed the base upon which the Holocene landforms were built. Glaciers have advanced at least four times in eastern North America; the Nebraskan stage started around one million years ago, the Kansan around 400 thousand years ago, the Illinoisian at around 125 thousand years ago, and the Wisconsinan extended from about 50 thousand years ago up to the end of the epoch, between 14 and 12 thousand years ago (Wayne 1966). At several times during the Pleistocene, ice lobes scoured an existing river basin located in the center of current Lake Michigan. This repeated carving, coupled with the added weight of the ice sheet (at times over a mile thick) created a large depression, which collected ice melt during glacial retreats and ultimately led to the formation of today's Lake Michigan. The Lake Michigan ice lobe of the Wisconsinan stage reached its maximum extent just south of the current crescent of Lake Michigan, and deposited considerable till along an existing ridge left there by previous advances. This terminal moraine, also known as the Valparaiso Moraine (Wayne 1966), formed a subcontinental divide; drainage north of the moraine initially flowed to the Atlantic, while moisture landing on its south side drained to the Mississippi River, flowing into the Gulf of Mexico.

The Valparaiso Moraine also served to contain the ice lobe's melt water within the same basin it had formed during glacial advance. This melt water formed a glacial lake, known as Lake Chicago (Capps 2001; Thompson 2002; Waldron 1998). Pauses in ice retreat or breaches and subsequent stabilization in the southern barrier (Capps 2001) created periods of relatively stable lake levels, during which time wave action formed definitive beaches. Glacial ice melted, leaving the Valparaiso Moraine and early Lake Michigan, around 14,000 years ago (Thompson 2002). A somewhat smaller ice advance and retreat formed the Lake Border Moraine around 13,500 years ago (Thompson 1990). Wave action on beach sands formed the Glenwood beach ridge by 13,000 years before present (Waldron 1998).

Sometime around 12,200 BP, the southern front of the Laurentian ice sheet began its retreat northward from the Lake Michigan basin, which opened drainages to the north, allowing water levels to drop. A small advance of glacial ice back into the basin at around 11,800 BP sealed those outlets, with the effect of stabilizing lake levels for a time. During this period, wave action scoured lake sediments and washed them up to the beach, forming what is now known as the Calumet dune or beach ridge at approximately 620 feet above mean sea level (AMSL).

Thompson (2002) provides a detailed explanation of Holocene dune formation adjacent to the southern tip of Lake Michigan. Glacial retreat at around 10,000 years ago recreated the spillways to the north, again lowering lake levels. The ice did not advance again as it had in the past, thus allowing a drop to perhaps 100 feet lower than modern levels (Thompson 2002). For almost 4000 years, water was not within sight of the modern shore line, but the combined effects of isostatic rebound and a change from the hot and dry conditions of the early middle Holocene functioned to raise, off and on, lake waters to roughly modern levels – about 580 feet AMSL – by about 6300 years BP, and to 23 feet above that by 5500 years BP (Thompson 2002). This high stage is known as the Nipissing I level; it was followed by a drop in water levels and then a smaller rise to 594 feet AMSL during Nipissing II at around 4500 cal BP (Baedke and Thompson 2000).

The Tolleston beach ridge was created by several interrelated processes and has a more complex form today than do the Glenwood and Calumet ridges. Its eastern portion is much like the other two large linear ridges but its western half consists of dozens of smaller ridges running parallel to the curving lakeshore. The formation of the eastern Tolleston ridge started around 6500 years ago with a short period of lake level stability or perhaps a small-scale drop in lake level, which allowed a linear sand ridge to form. This ridge gradually moved inland as storms washed water and sediments over it. This process also created a lagoon between this ridge and the older Calumet ridge. By 4500 years BP (during Nipissing II times), this portion of the Tolleston ridge had stabilized at about 605 feet amsl. It had grown too tall for further wave deposition by the lake, which had by then stopped rising. The lagoon behind the ridge began to dry up, and became the Great Marsh, composed of a series of ponds interspersed with wetlands.

The smaller concentric beach ridges to the west of the marsh were formed during this time and continued to form with short-term (i.e., approximately 33 year) cycles of lake level rise and fall as overall levels dropped during the last half of the Holocene. This smaller-scale cycle was likely still in process when Euroamerican settlers altered the drainage systems of this area in the late 19th century (Thompson 2002).

While alluvial and lacustrine forces have produced the major topographic relief of the Indiana Dunes area, aeolian processes have shaped the characteristic details of these landforms. Winds coming off the lake act on sand deposited by waves along the coast. Sand, originating from glacial till at the north margin of the Lake, is brought to the south shoreline by currents running along the east and west shores. After waves deposit these sands on INDU beaches, winds shape the deposits. While most winds are from the south and southwest, and average approximately 12 mph, much stronger ones (up to 50 mph) sometimes blow from the opposite direction (Capps 2001). Foredunes form parallel to and just behind wide flat beaches with abundant sand supply, and usually accumulate 50 to 75 feet in height (Capps 2001). Another kind of dune is formed via removal of loose sand from channels or bowls within older dunes. These, termed blowout dunes, can grow to hundreds of feet wide and up to 200 feet high (Capps 2001). Such formations have made great impressions on tourism in the area, both before and after formation of the park. Mount Tom, for example, is a large stabilized blowout dune. As the highest dune in the park, it served as a point of inspiration to those involved in setting aside this area as part of the NPS (Albright and Schenk 1999; Engel 1983).

Figure 1 illustrates the modern distribution of these late Pleistocene and Holocene features in the INDU area. The Lake Border Moraine is largely outside the current INDU boundary, though intersected by the southern boundary line of the park’s contiguous parcel. The Glenwood Dune ridge occupies most of this parcel’s southern portion, as does the adjacent Calumet Dune Ridge just north of it. Wetland areas (discussed further in the following section) are apparent just north of the Calumet Dune Ridge. These wetlands are bounded on their north by the Tolleston Dune Ridge. Finally, more recent and active dune ridges occur closest to the shore, as depicted on Figure 1.

Ponds, Marshes and Bogs

Beaches and dunes are not the only features that distinguish the National Lakeshore. Low areas between and beyond the beach and dune ridges contribute to the unique character of the landscape. Interdunal ponds form in lower areas, providing a contrast in resources and habitat to the surrounding topography, boosting biological diversity of the area. There are three main interdunal pond or marsh areas within the main body of INDU: one between the Glenwood and Calumet dunes, another between the Calumet and the Tolleston dunes, and a third between the Tolleston and recent dunes. Figure 1 shows the location of the largest low-lying area between the Calumet and the Tolleston ridges.

Different processes created other wet areas within the park boundaries. Two bogs, Cowles and Pinhook, are located within depressions formed by glacial remnants. These chunks of ice separated from the main ice lobe during glacial retreat, and were subsequently isolated and buried by moraine till. When these remnants later melted, they created depressions without outlet, and formed kettle lakes.

Having little or no outlet contributes to bog formation, but not all kettle lakes become bogs. The establishment of sphagnum moss is pivotal. This plant grows rapidly and is highly absorbent, holding many times its own weight in water (Waldron 1998). The absence of circulation allows moss to form a mat on the water's surface that expands horizontally as well as down into the depths. Other plants may establish upon this foundation, including trees and shrubs. The moss also contributes directly to another feature of bogs: acidic water. As individual moss plants die and decay, they lower the pH value of the water and, without outlets or inlets, this effect accumulates. The surface cover also keeps oxygen out of the water, and the lack of inlets reduces the amount of minerals introduced to the water. Acidity, low oxygen, and low mineral counts combine to inhibit bacterial growth, which in turn prolongs the time required for organic decay and ultimately fosters moss mat growth. This cycle of factors creates a balance unique to the bog environment, fostering a unique floral community including carnivorous plants (e.g., pitcher plants) and orchids such as the Lady's Slipper.

Pinhook Bog is an excellent example of the bog vegetative model; by contrast Cowles Bog is not (Waldron 1998). The former has very acidic water, at a pH of 3.5, while the latter is slightly basic (pH of 7.5) and technically qualifies as a fen (Waldron 1998). Cowles' water quality results from the apparent presence of an opening to an underground spring within it (Waldron 1998) and the fen is thus associated with a different, yet equally unique, set of vegetation as a result. In any case, both kettle lake environments within the borders of INDU contribute directly to the distinctive set of geologic and biotic resources that comprise the Lakeshore.

Bordering Physiography

As mentioned above, the Valparaiso and Lake Border Moraine systems (Waldron 1998) form a crescent around the southern end of Lake Michigan and were created by sediments pushed in front of glacial advance. The Valparaiso Moraine is located south of INDU boundaries; its segment within Indiana is 60 miles long, varying from five to 15 miles in width (Capps 2001). The Lake Border Moraine (see Figure 1) was formed by a more recent and minor glacial advance during the Wisconsian retreat of the Lake Michigan ice lobe.

Geologists refer to the area in which INDU is located as the Calumet Lacustrine Plain (Schneider 1966), implying that the area between the lake and the Valparaiso moraine had formed a portion of the bed of glacial Lake Chicago (i.e., ancestral Lake Michigan). The Plain is bounded on the south by the Valparaiso Moraine, which in turn is bounded on its southern side by the Kankakee Outwash and Lacustrine Plain (Schneider 1966). This latter unit forms the southern extent of the area considered in this overview, and it is tied physiographically, biologically, and culturally to the Indiana Dunes area.

Schneider (1966) suggests that the sluggish drainage pattern exhibited by the Kankakee River and marsh system is indicative of a lacustrine origin, but also notes that sediments such as gravel deposits interbedded with sandy deposits suggest glacial outwash from the Valparaiso area. It is reasonable to assume that a combination of sedimentation from standing water as well as higher energy processes combined to form this unit. The slow, shallow drainage system associated with the Kankakee River resulted in a large set of marshlands interspersed between raised areas and served as the focus of habitation throughout prehistory. This setting supports a wide variety of resources and is historically reputed to have been prolific in waterfowl and small mammals (Greenberg 2002; Miles 1913; Petty and Jackson 1966).

Vegetation Through Time

The multi-dune environment and the chronological ordering of formations described by geologists facilitated the study of plant ecology. The closely spaced differences in elevation, resulting from geological processes, have led to concomitant differences in soils, moisture, and microclimate. These are reflected in a broad range of floral species over a relatively small area around INDU – a set of plant communities that has fueled research of international significance.

Henry Chandler Cowles and Plant Communities

In the early part of the 20th century, University of Chicago botanist Henry Chandler Cowles noted differences between plant communities on separate but similar dune systems along the southern Lake Michigan shore. Cowles' work at the dunes was a result of his existing interest in plant communities and physical site properties, his proximity to the lakeshore, and his own training in dynamic geology, i.e., the study of how landforms change (Waldron 1998). His combined interests in botany and geology focused his attention on the interaction between plants and changing landforms. His observation of diverse plant communities in otherwise similar settings (along separate dune ridges) prompted study and explanation.

Cowles began his dunes studies in 1896, lecturing on plant ecology at the University of Chicago, where he stayed until his retirement in 1931 (Engel 1983:73). During these years he made a great impact in research in this field. Over time, Cowles and his students recorded a great many species of vascular plants (over 1400 are currently known), and grouped them into six plant communities. These include the Beach Association, the Foredune Association, the Cottonwood Association, the Pine Dune Association, the Black Oak Association, and the Beech Maple Association. Cowles' explanation for the differences between these communities revolved around time as some groups, requiring more shelter and humus development, took longer to establish than others. This concept and its demonstration at Indiana Dunes formed a basis for the development of ecological theory during the 20th century.

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Beach Association plants are adapted to extremely dry conditions typical of the well-drained sandy and wind-blown setting near the water. Species in this group have desert-like adaptations such as succulent (water-holding) structures and deep root systems. The Foredune Association consists of plants such as rhizome-propagating grasses that thrive in blowing sand settings. Such plants serve to stabilize sediments and begin the process of soil formation. The Cottonwood Association is characterized by the tree of that name. Cottonwoods (Populus deltoides) are the first trees to grow on new dunes, likely owing to their flexible phenotype. They adapt to shifting ground surfaces by developing stems from roots when sediments are removed and by forming roots along their trunks as sediments accumulate. The stabilizing effect of these trees in new dune settings paves the way for other plants, furthering the soil development started by the Beach and Foredune Association plants. The arctic bearberry (Arctostaphylos uva-ursi) exemplifies plants that typically take hold in areas with established cottonwoods. Such plants tolerate slow sand deposition and, in turn, foster the growth of the pine species characterizing the subsequent Pine Dune Association. The deciduous (i.e., Black Oak and Beech-Maple) associations are less common at INDU. The Black Oak Association is apparent at Miller Woods, in an area sheltered from the wind and cold. Black Oaks (Quercus velutina) tend to out-compete pines in such settings, possibly due to their greater tolerance to fire. The Beech-Maple Association thrives only in the most stabilized and older soils. This community is observed in the Bailly-Chellberg area in the glacial clay of the Lake Border Moraine.

Henry Chandler Cowles' great contribution to the study of plant ecology, built on work in the Dunes area, stands today as the basis for continued study. In fact, the theory of succession, initiated and popularized by Cowles and his intellectual progeny, retains its place in current biological research literature. Recent researchers have expanded on his concepts, favoring a view taking into account greater complexity. In lieu of the unilateral theory of facilitation of later species by earlier ones, other researchers suggest that interspecies relationships are not all of a fostering nature, and that certain species communities actually impede the success of other communities. Poulson (1999) for example, argues that processes suppressing certain plant groups (e.g., fire's impact on pine communities) are encouraged by other plant groups (e.g., black oak savannahs). Poulson concedes that many species do facilitate the colonization of other species as posited by Cowles and subsequent researchers, but notes that some actually inhibit the colonization and success of other communities. In short, the processes intrinsic to interplant and intercommunity relationships are complex and multimodal.

Overall, biodiversity at Indiana Dunes is evident in the high number of plant species. In fact, with over 1100 flowering plants and ferns, INDU is one of the highest ranked NPS units in terms of native plant diversity per land unit area. This plethora of life is the result of the intersection of ecological zones at the southernmost tip of Lake Michigan, bridging the Great Lakes and Midwestern ecosystems. The effect is augmented as well by the variance in topography offered by the dune and wetland systems. This compaction of life zones within a relatively small space offers habitat amenable to a wide variety of life forms.

Weather and traffic patterns around the tip of Lake Michigan also have supplied ready sources for new varieties.

Biotic Resources and Historic Occupation

As plant ecology has demonstrated, vegetative communities have evolved through time given changing environmental conditions and landforms through the Holocene. In addition, the influence of animal (including human) populations on the vegetation of the INDU area has continued to influence the distribution of particular species. The influence of aboriginal use of the land and resources was noted by early European observers (Day 1953), and more recent influence has been noted in greater detail. Alfred H. Meyer worked throughout his career to study the historic geography of the southern Lake Michigan area, integrating information on historic population centers, transport routes, and natural resources (Kilpinen 1996). He pioneered the application of historical geography to the southern Lake Michigan region, demonstrating a sequence of human occupation of the Kankakee and Calumet River surroundings. Most significant for this study, he synthesized the sequence of vegetation and landscape changes derived from historical data sources, including historical accounts of early pioneer settlements, genealogical references, and archeological writings (Meyer 1954, 1956). Meyer's significant contribution was his ability to synthesize multiple sources to produce plan maps of the region, including locations of settlements, resource centers, and transport routes at different points in history. He also produced series of "ecological silhouettes," or profiles of transects across his study area to better illustrate topographic changes through time associated with human activity, especially significant during and after the mid-1800's with the greater onset of European settlement and associated drainage efforts. His work is reflected in Figures 2 and 3, which show the relation of vegetation, topography, and land use in the immediate INDU area (Figure 2), and the relation of vegetation and landuse in the larger Indiana Dunes area (Figure 3).

Meyer reports on the kinds of vegetation noted in historical sources, such as land surveys, in order to frame human use of the Calumet area. His synthetic map includes the "fundament," or pre-European vegetation in the area (Figure 3) during the time of the fur trade and occupation of the study area by the Pottawotami Indians. It is important to note here that Meyer used the term "fundament" over "native" to describe this subject matter, as he recognized that European use of this area was not the first human influence on the landscape. Aboriginal use surely also had an impact.

He notes that particular groups of vegetation are associated with specific topographic settings. For example, "oak barrens" consist of yellow, white, and red oak common on the sandy uplands such as the Glenwood beach ridge, and mixed forests of oak and pine were also often seen in such settings. The marshes adjacent to settings such as the Glenwood ridge contained heavy cranberry populations, which was a significant part of proto- and early-historic economies of the region (Meyer 1954:267). In addition, other fruits were common throughout the Calumet and south Chicago region, such as wild plum, crabapples,

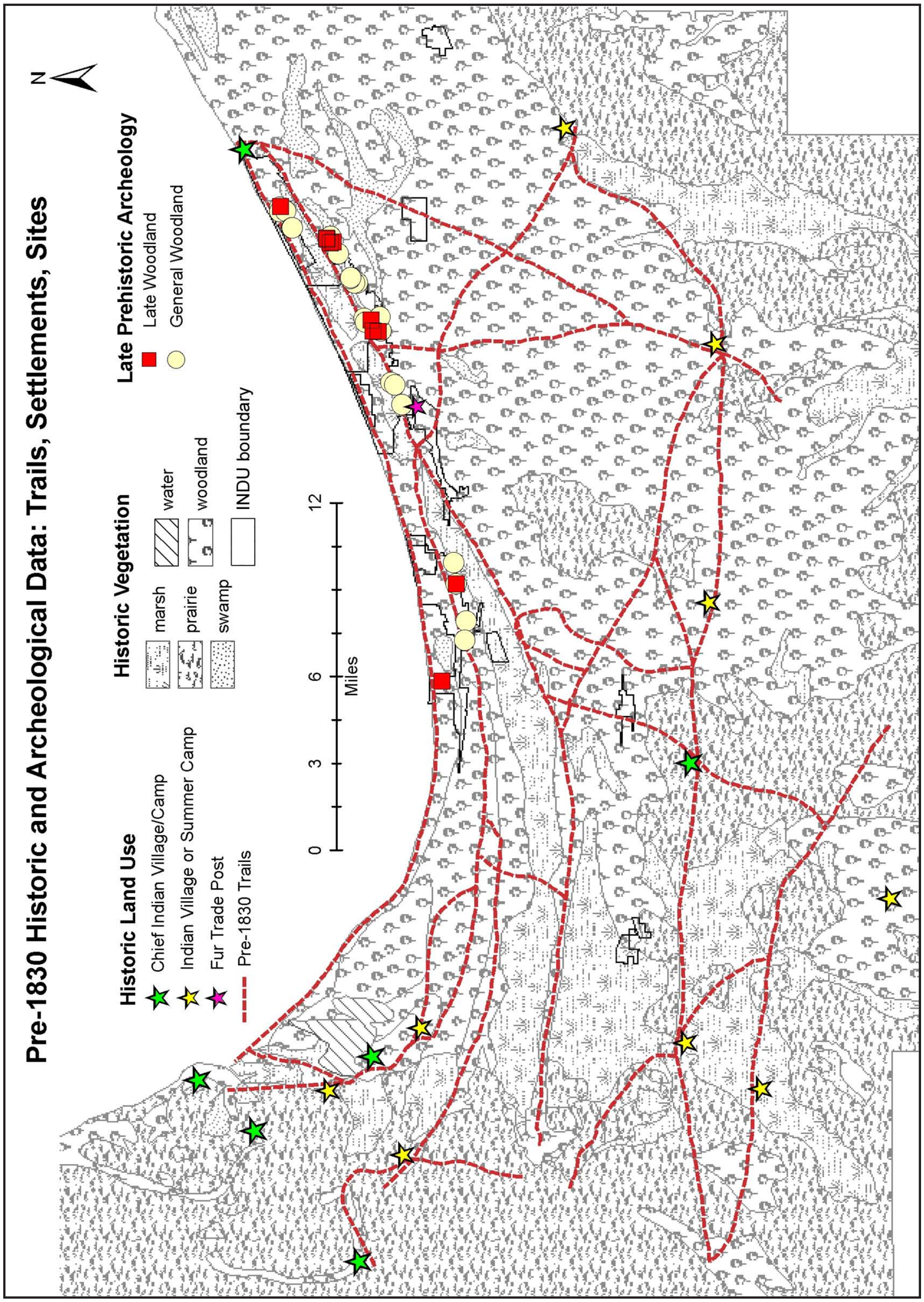

Figure 2. Late Prehistoric and early Historic occupation, and historic vegetation in the Indiana Dunes area. Data derived from Meyer 1954 and ASMIS database.

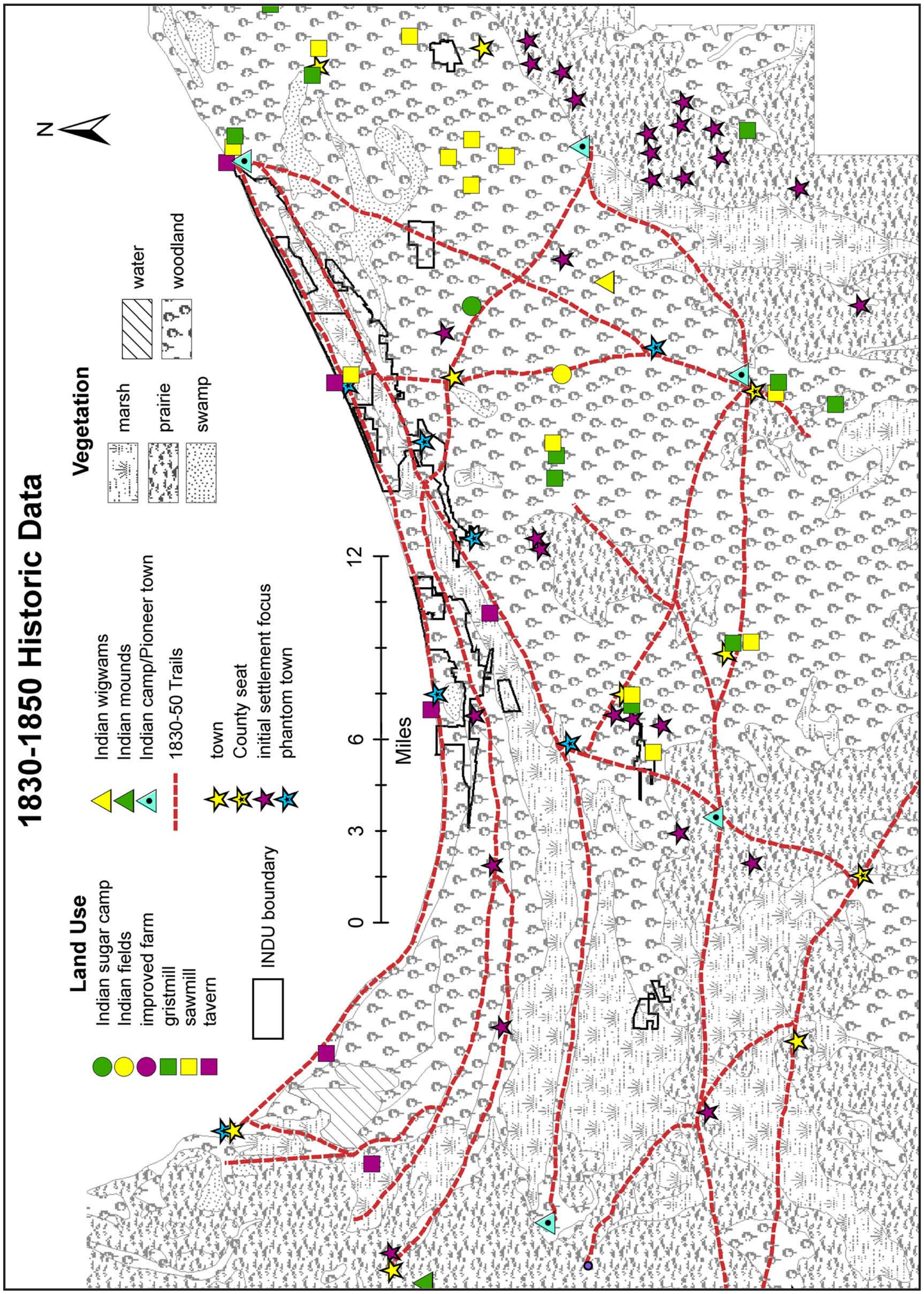

Figure 3. Historic occupation, and historic vegetation in the Indiana Dunes area, 1830-1850. Data derived from Meyer 1956 and ASMIS database

various kinds of nuts (hazel, hickory, walnut, beech), and a myriad of berries (e.g., huckle, black, whortle, rose, goose, straw, etc.). Wild rice was common in the wetlands as well, and maple trees could be tapped for sap to produce sugar.

The varied topography of the Indiana Dunes contributed to a wide range of plant and animal life in this area, creating varied subsistence opportunities for humans throughout prehistory and into the historic period. Meyer's analysis of the fundament vegetation prior to significant historic European settlement demonstrates the influence of this varied topography, as well as the high-traffic character of this tip-of-the-Lake location.

Area Resources and Recent Political History

As outlined above, the INDU area offered a rich and varied landscape and set of associated resources valuable to hunter-gatherers and foragers of prehistory and the early historic period. The agricultural ideology driving post-colonial settlement, however, caused American observers, such as land surveyors, to view this area as largely void of value (Franklin and Schaeffer 1983). The marshes, swampland, and wet prairie areas so rich in plant and animal life were not immediately amenable to cultivated crops, They also made transit to and from the forested areas to the south, east, and west of the Indiana Dunes area very difficult. Wooded zones further south could be cleared for agricultural use and were thus most desirable to settlers. However, several natural attributes of the Indiana Dunes region ultimately made it valuable to competing forces, if for very different reasons.

Converting "Wasteland" to Bounty

The Indiana Dunes area has historically played a contentious role in area politics, even prior to state boundary formation within the "Northwest" territory of 1787, when the Ohio, Indiana, and Illinois lines were initially drawn (Franklin and Schaeffer 1983). Even though general opinion in the late 18th century deemed the land within the study area useless, lake frontage was recognized as valuable. In fact, the Indiana Territory's delegate to Congress lobbied to provide his territory with shoreline (Franklin and Schaeffer 1983:5). John Tipton also termed this area a "wasteland" while surveying the Indiana-Illinois boundary in 1821 and European-American settlement remained sparse in this area, relative to that in the central and southern reaches of Indiana, through the mid-century (Cottman 1930; see also Chapter 4 of this report). This was in spite of a wave of speculative settlement and platting of "Dream Cities," meant to rival Chicago as Lake Michigan port towns. Communities such as City West, located at the mouth of Fort Creek, were initially occupied in the mid-1830s but abandoned soon after due to environmental, economic and political obstacles (Sturdevant and Bringelson n.d.).

The cutting of ditches eventually drained the marshlands, opened rail paths, and resulted in cheap productive land – all factors contributing to substantial settlement by the latter part of the 19th century (Franklin and Schaeffer 1983:6). In addition, the abundant sand dunes attracted the mining industry, as sand was used for swamp-filling, urban expansion, and railroad building. During rebuilding after the Great Chicago Fire of 1871, city planners operated with reduced tolerance for pollution-generating industry. Thus, in 1889, Standard Oil relocated from Chicago to Whiting (Franklin and Schaeffer 1983). This encouraged certain companies, such as Standard, to look elsewhere for production facility locations and Indiana commerce and government officials were, in the main, eager for industry to locate within or near their communities (see Cottman 1930 for an example of a state publication with a positive viewpoint on industrial and other development of the dunelands). The discovery of iron ore in Minnesota increased the call for mill facilities in the southern Lake Michigan area, where access to the other necessary ingredients (coal and limestone) was easy (Franklin and Schaeffer 1983). By the turn of the century, this area was sought by the steel mill industry for its inexpensive and accessible frontage to Lake Michigan.

The Green Movement

Other perspectives of how to best treat the Indiana Dunes also developed around the turn of the 20th century. The crowded, dismal nature of the immigrant slums of the Chicago urban areas sparked a call for open natural areas, accessible to people of all income and social brackets (Cockrell 1988; Engel 1983; Franklin and Schaeffer 1983). The 1880s and 1890s saw the growth of the Populist movement among aesthetic circles in Chicago, which held at its core the notion of the common good, that "people might come together and solve their problems through various kinds of specific cooperative policies and institutions" (Engel 1983:52). From this movement sprouted the Playground Association of Chicago during the first decade of the 1900s, devoted to providing green space for all. This group started a series of Saturday afternoon walks outside of the city among the Dunes in 1908. This philosophical-turned-political movement is intrinsically linked to the formation of INDU. For example, Henry Cowles published his first seminal papers on the Dunes ecology in the 1890s and provoked far-flung scientific interest in this part of the world; he was also a member of the Populist movement (Engel 1983). Whether his philosophical leaning influenced his focus of study on the Dunes or vice versa is unclear. It is most likely that each interest fed the other. In any case, his involvement in the movement surely had profound influence on the ultimate fate of the Indiana Dunes.

The Populist movement combined the knowledge and interests of naturalists with the influence of like-minded publishers, statesmen, and artists, to sway the opinion of a broad spectrum of people in favor of the conservation of Indiana's lakeshore region. The Populist movement preceded the formation of the National Park Service by several decades, but the "National Park Idea" appears to have direct ties to it. However, industry continued to gain footholds in the area at the same time. For example, by 1910 the largest sand dune of the Indiana shore, known as Hoosier Slide, had been hauled away by the Ball Brothers Corporation to make glass and Northern Indiana Public Service Company (NIPSCO) had installed a power plant on the flattened site (Cockrell 1988).

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In response to such actions, conservationists formed the Prairie Club of Chicago in 1911 and formally proposed to protect part of the Dunes for posterity. This club included such historically influential members as Jens Jensen and Henry C. Cowles, as well as a number of others influential in their day, and eventually formed the National Dunes Park Association (NDPA) in 1916. The mission of this latter group was to lobby for the creation of a National Park in northernmost Indiana, and did – with the help of Indiana Senator Thomas Taggart – garner attention from the Secretary of the Interior. A public hearing and formal tour of the Indiana Dunes by Interior and NPS officials occurred in October of 1916, followed by a favorable report from the NPS (Albright and Schenk 1999:179-186). Within five years the NDPA had succeeded to the extent that a resolution was passed in Congress to explore the possibility of a Sand Dunes National Park. This group also sponsored a pageant in the Dunes to attract attention to its cause, incorporating 600 actors, and attracting at least 25,000 spectators (Cockrell 1988; Franklin and Schaffer 1983). Thus, by the late second decade of the 20th century, it seemed the path for a national park was laid. However, many factors worked against this goal. The onset of World War I moved national and local attention away from the preservationist movement, and a sluggish economy afterwards depressed efforts for a longer period of time. The NDPA shifted its focus to the establishment of a state park instead. This compromise, with its relatively small geographic impact (approximately 2200 acres) had a broader support base, including industrialists, and Indiana Dunes State Park opened to the public in 1926 (Cockrell 1988:30).

Save the Dunes

Another landmark in the history of the establishment of INDU was the formation of the Save the Dunes Council (SDC), an organization started in 1952 by Dorothy Buell, which still functions today. This was in response to plans for a deepwater port within the area, forwarded by commercial and state government interests in the hopes of attracting further industry and commercialization to the Dunes region. The SDC aimed to raise funds for the direct purchase of dune lands, in the hope of a more successful petition to federal officials. One of the main obstacles in the pre-war efforts to establish a National Park Service (NPS) unit was the absence of funds to acquire land (prior to that time all NPS units had been formed in the west from non-private lands).

The SDC had some success, purchasing Cowles Bog, but was still met with considerable opposition from the Indiana state government. In 1953, Governor George N. Craig sponsored the sale of public bonds to finance a new harbor, and by 1955 enough federal, state, and private funds were garnered to buy 1500 acres for that purpose. In addition, Bethlehem Steel Company also began buying land in the area. This, in combination with the purchase of area lands by private speculators, drove prices beyond the reach of the SDC (Cockrell 1988).

In 1957, Buell approached Illinois Senator Paul Douglas, who as a child had vacationed in the Dunes, and as a Chicagoan could easily see the utility of conservation and public use in this area. In 1958, Douglas introduced legislation for an NPS unit in the Dunes and SDC members intensively lobbied the House and Senate. An intricate and oftentimes frustrating series of battles over land acquisition and funding followed, with National Park proponents composed of Illinois politicians and private citizens and opponents comprising Illinois politicians and industrial interests. House Republican leader Charles Halleck represented the population around the Dunes area and had based a large portion of his political career on promising a deep water port and harbor here. NIPSCO presented a prolonged struggle in its plans to locate a power-production facility at its existing location. In the ongoing debate over the deep-water port at the outlet of Burns Ditch, industrial, public, and private supporters believed that the SDC surreptitiously promoted Chicago or Lake County port interests. All of these factors were active through the battle for the establishment of the NPS unit during the 1960s. These efforts moved forward only when the "Kennedy Compromise," including approval and funding for both park and harbor, was signed in September 1963 by its namesake. The tragic events of the following November, however, diverted attention and action from this avenue, and opposition to the park remounted. Lyndon Johnson did support his predecessor's intent and found the proposal consistent with his concept of the "Great Society," featuring an emphasis on urban parks and outdoor recreation (Cockrell 1988). Finally, on November 5, 1966, Johnson signed the bill establishing 8100 acres and including 13 miles of shoreline under the management of the National Park Service. The complex maneuverings were certainly not finished at that point, continuing in the form of budgeting and further land acquisitions for years afterward. Today, INDU and the Indiana Dunes State Park together encompass approximately 15,000 acres.

Industry versus Conservation

Fundamental differences in perspective and purpose have driven conflict about the Dunes area for over a century. This conflict has directly influenced the current state of southern Lake Michigan, with its striking intersection of natural and industrial features.

It is obvious that people of a larger region had long recognized the Dunes as a useful area; as will be seen in the next chapter, the archeological record suggests that it was used by a wide variety of people in prehistory. The interaction of human activity and other the biota in this area through prehistory has yet to be fully explored.

Industrial, residential, and commercial development has contributed to the fragmentation of this area, so critical to maintaining the life mosaic. Through the years, the Dunes area has been valued for its location adjacent to Lake Michigan and urban centers, and its accessibility to various Midwestern supply sources. This "crossroads" placement has also helped to create the uniquely complex and compact ecosystem valued at INDU, and certainly played a central role in the formation of the archeological record of the Dunes.

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3. CULTURE HISTORY OF SOUTHERN LAKE MICHIGAN, NORTHERN INDIANA, AND THE INDIANA DUNES NATIONAL LAKESHORE

Precontact Culture History

The culture history of northern Indiana prior to historically documented and direct contact with Europeans is divided into four broad traditions: Paleoindian, Archaic, Woodland, and Upper Mississippian. In the sections that follow, each tradition is characterized by its timing and distribution, material culture hallmarks, interpretations regarding settlement and subsistence patterns, and temporal and spatial relationships with other regional traditions. Relevant information regarding known resources within INDU is discussed for each tradition. Following this, a discussion of historic developments focuses on trends in Euro-American land use, with a brief outline of some prominent historic cultural resources within INDU.

This chapter describes current knowledge regarding changes through time in archeological phenomena and interpretations of prehistoric lifeways. Estimating the age of artifacts and archeological complexes relies on several techniques. The two most ubiquitous are radiocarbon 14C dating and the cross-dating of artifacts using temporally diagnostic traits. The latter is simply the estimation of an artifact's age based on morphological similarity (isomorphy) with artifacts of demonstrated age. This is especially common practice with projectile points and pottery types. Several excellent publications synthesize artifact styles and chronology in the mid-continent (e.g., Bowen 1996; DeRagnaucourt 1991; Griffin 1952a, 1952b; Fagan 1995; Justice 1987), and are referenced as appropriate in the text. Age estimates based on cross-dating of artifacts are reported in this document as ranges of calendar years (BC/AD). More general estimates for cultural complexes are based on cumulative knowledge, cited the same way, with appropriate literature referenced.

The second dating method commonly used, radiocarbon 14C dating, has revolutionized our understanding of archeological phenomenon throughout the world (Gittens 1984; Taylor and Aitken 1997). Radiocarbon dating is based on measuring the amount of 14C residing in organic materials following the steady conversion of unstable 14C to stable 13C isotopes through time. Radiocarbon ages are generally reported as BP or "Before Physics", with the age of nuclear physics designated as 1950. The abbreviation BP is now usually referred to as "Before Present."

Radiocarbon dating provides archeologists with a chronometric tool to measure the age of archeological samples and build precise chronological frameworks needed to evaluate and interpret prehistoric human culture and behavioral changes over decades and millennia. However, the use and reporting of the results of this dating method can lead to confusion when describing age ranges of archeological components and artifacts. During the late 1950's, it became clear that there is not a direct correlation between radiocarbon years (BP) and solar or calendar years (BC/AD) (de Vries 1958; Taylor and Aitken 1997:71). These age discrepancies are the result of increases and decreases through time in the amount of 14C isotopes in the atmosphere that is absorbed by living organisms. Therefore, the amount of 14C available in an organic material at the beginning of the radioactive decay process is not uniform and can thus lead to divergence on the order of a few hundred to several thousand years when comparing radiocarbon years to calendar years. Tree ring samples, precisely dated back to 10,050 BP using dendrochronology, have been directly radiocarbon dated to determine the age discrepancy brought about by the variability in atmospheric 14C (Taylor and Aitken 1997:73; Stuiver et al. 1993). The resulting calibration curve has demonstrated that earlier age ranges such as 10,000 to 8,000 B.P. are potentially less precise than the more recent 2,500 to 0 B.P. range, when there were fewer pronounced fluctuations in the amount of atmospheric 14C (Taylor and Aitken 1997:76). With the addition of new research on 14C levels in the atmosphere through time, updates to the calibration curve produce increasingly accurate results.

The multiple expressions of 14C dates also present problems for reporting of radiocarbon samples, calendar years, and estimated ages of archeological materials. Archeologists must explicitly state what types of dates are being reported. In this document, 14C dates are reported when possible as primary lab results, including lab reference number, in radiocarbon years BP (rcybp). The reader can access the CALIB Radiocarbon Calibration program, at http://radiocarbon.pa.qub.ac.uk/calib/ (Stuiver et al. 2005) in order to transform radiocarbon data into calendar years. If primary lab results are not available in the referenced source, calibrated results are reported as such in calendar years BC/AD.

Paleoindian Tradition

The initial movement of people, termed Paleoindian, into the Western Hemisphere is generally thought to have occurred near the end of the Pleistocene around 12,000-10,500 BC and continued until approximately 8,800 BC (Holmes and Potter 2002; Lepper 1999; Shott n.d.; Snow 1996:135-138). Although contested by traditional Clovis-first proponents, others have proposed settlement of North and South America by groups of Pre-Clovis hunter-gatherers thousands of years earlier than 10,500 BC (Adovasio et al. 1990; Dillehay 1997, 2000).

Numerous Early Paleoindian sites have been described for the Great Lakes area, indicating initial settlement at around 11,000 BC following the glacial retreat northward (Koldehoff et al. 1999; Lepper 1999:370; Mason 1981; Tankersley et al. 1990). This period is marked by the occurrence of large, lanceolate-form bifacial projectile points and knives, distinguished by fluting or flake scars that extend up the faces from the point's base. Current debate in the Great Lakes area has centered on the definition, identification and cultural significance of several distinct fluted point types including Gainey, Clovis, Barnes, Cumberland, Holcombe and Crowfield (Deller and Ellis 1992; Lepper 1999:371; Morrow 1996; Shott n.d.; Tankersley et al. 1990). Fluted lanceolate points have been alternately interpreted as knives used for butchery and as spear points hafted onto a detachable foreshaft similar to those used by modern Inuit whale hunters (Boldurian and Cotter 1999:94-105; Osborn 1999).

The Late Paleoindian Tradition transition is thought to have begun around 8,800 – 8,400 BC with changes in projectile technology and an increasing reliance on Pleistocene bison as well as modern species (Lepper 1999; Shott n.d.; Snow 1996). This tradition extends to around 8000 BC when the transition to the more regionalized Archaic Tradition cultural complex occurs (Snow 1996). Point types of the Late Paleoindian Plano Tradition such as Plainview, Scottsbluff, Eden, Hell Gap, and Agate Basin were initially defined from sites in the Great Plains and Western United States (e.g. Frison and Stanford 1982, Frison and Todd 1987, and Irwin-Williams et al. 1973). Late Paleoindian sites have also been found at many locations in the Great Lakes area and appear to be focused on numerous game species such as bison and caribou (Lepper 1999:378; Mason 1981).

Subsistence patterns during the entire Paleoindian era were likely based on hunting large game. This is supported by the morphology of the lanceolate projectile points and their occasional association with megafaunal remains. Lanceolate points have been found at numerous locations throughout the United States in association with the remains of mammoth and other megafauna species (Boldurian and Cotter 1999; Frison and Todd 1987, Frison and Stanford 1982; Meltzer et al. 2002). Boldurian and Cotter (1999:115-116) have proposed that Clovis and Folsom hunter-gatherers focused on marshy and pluvial environments, basing their movements relative to sources of fresh water. Climatic conditions during the Pleistocene/Holocene transition and the mobile nature of Paleoindian hunter-gatherers seemed to have placed a premium on such resources. These movements might also correlate to the use of watering holes by game species (Boldurian and Cotter 1999:115).

Paleoindian social organization has been characterized as a highly mobile forager system with domestic groups centered on the small nuclear family (Kelly and Todd 1988; Anderson and Gilliam 2000). Paleoindian groups have been characterized as "high technology foragers" with more concern being placed on hunting technology and high mobility than on knowledge of specific localities (place oriented foragers) (Kelly and Todd 1988:239).

The end of the Paleoindian Tradition is indicated by changes in settlement and subsistence patterns, differences in point styles, new lithic technologies, and a greater degree of regionalization. Interactions with the environment changed gradually as the environment changed, and the resulting record is distinguished by archeologists as a separate tradition.

No Early Paleoindian sites have been recorded within INDU. In fact, Tankersley et al. (1990) report that relatively few Early Paleoindian sites have been found anywhere in northwest Indiana. This is in direct contrast to southern Indiana and other areas, but it is possible that it accurately reflects human land use during that time. Late Pleistocene lake levels were much higher than today, and the Glenwood beach ridge – INDU's oldest upland form – was not created until some 13,000 years ago. Given the sparse vegetation expected on this landform in its early stages, extensive use of this surface for hunting (i.e., use of spear points) would be surprising. However, several unfluted Late Paleoindian lanceolate points have been found at INDU. Forest Frost (2001:78-79) surface collected an Agate Basin projectile point from the surface of site 12PR505 at the Chellberg Farm. Limp (1974:Photo 2) has also illustrated an unfluted lanceolate projectile point base from the Bailly Homestead. Before the creation of INDU, private collectors (e.g., C.R.N. Bergendahl and Ted Weitzel) had recovered several Late Paleoindian artifacts from the Lakeshore and surrounding area.

As few Paleoindian artifacts have been found within the park and fewer of these finds have been mapped to specific locations, we know very little of how people utilized the landscape during this time. Both Chellberg Farm and the Bailly Homestead, the only currently documented locales in the park where Paleoindian artifacts have occurred, are positioned near the Little Calumet River on the Calumet Plain, south of the Lake Margin.

Archaic Tradition

The Archaic Tradition in the eastern United States has traditionally been subdivided into three temporal subsets, or periods. The Early Archaic Period in the Eastern United States spans from 8000 to 6000 BC, which is followed by the Middle Archaic Period from approximately 6000 to 4000 BC and the Late Archaic Period from 4000 to 1000 BC (Fagan 1995:348). The Archaic Tradition is characterized by a generalized hunter-gatherer economy and by increases through time in sedentism, long distance trade, ceremonialism, and regional specialization.

The early Holocene climate is marked by increases in annual precipitation and temperature over late Pleistocene levels (Davis et al. 2000). This trend in moisture levels reversed during the mid-Holocene to create an arid period and lowering in lake levels (Anderton 2001). These changes fostered a transformation in floral communities from boreal conifers to deciduous hardwood forests. Forest communities and related biota eventually migrated northward with rising temperatures. Shifting environmental zones were accompanied by alterations in animal resources as well; the megafauna of the Pleistocene (e.g., mammoth and mastodon) disappeared, while most modern fauna remained or increased in number through natural selection processes.

Overall, Archaic Tradition material culture reflects a changing adaptation to new environmental conditions during the Holocene with trends toward increasing diversity of toolkits and resource acquisition. Significant variation begins to appear in hafting technologies and projectile point styles with the eventual replacement of lanceolate styles by corner-notched, side-notched, stemmed, and bifurcate-stemmed points. The stone tool technology of the Archaic is also marked by the addition of grinding and smoothing (Kellar 1993) and a greater use of bipolar core technology (ie., expedient use of smaller nodules; see Goodyear 1993). This expanded technology resulted in tools and assemblages that are much more variable across time and space than were their Paleoindian counterparts and allowed Archaic peoples to use a broader range of the Holocene resources that became available following the end of the Pleistocene glaciation (Mason 1981; Snow 1996).

A shift in subsistence from generalized hunting and gathering towards the exploitation of specific resources marks the beginning of the Middle Archaic Period (Fagan 1995). This subtradition is marked by the seasonal scheduling of resource extraction activities, and the accompanying move to longer-term settlement and the development of base camps. Middle Archaic sites can render greater densities of debris, resulting from the longer-term and repeated use of certain locations on the landscape.

During the Late Archaic Period, increasing population size and abundant resources led to increased sedentism and the development of new and regionally distinct culture complexes. It is during this time that the Riverine Tradition or Shell Mound Archaic developed in the Mid-continent and Southeast (Cunningham 1948; Fagan 1995:381-390; Faulkner 1960; Ritzenthaler 1957). Sites of unique ritual significance with ceremonial mound architecture such as Poverty Point in Louisiana also appeared (Fagan 1995:393; Snow 1996:153-154). In many ways, regional specializations became the hallmark of the Late Archaic throughout the Eastern Woodlands.

Distinctive material culture complexes also developed in the southern Lake Michigan region, including Old Copper, Glacial Kame, and Red Ochre Cultures. The Glacial Kame complex was defined by the use of natural glacial kame features as cemeteries, and is marked by powdered ocher, marine shell gorgets, slate "birdstones" (Faulkner 1960; Kellar 1993), and various bone tools within mortuary assemblages. Cemeteries are unmarked, and burials are set into natural features. Red Ochre, another mortuary complex described for Indiana, is named for the quantities of red ochre placed over burials (Faulkner 1960). In this case, the burial process sometimes created small artificial mounds. While the presence of flexed, cremated, or secondary burials associated with red ocher is diagnostic of this complex, certain artifacts are also characteristically associated with these burials. These include constricted stemmed points, rolled copper beads, and large caches of bifaces (Schurr 1993) including "turkey tails," long, bi-pointed bifaces with distinct but non-functional notching near one end (Kellar 1993). There are also artifacts found in northern Indiana associated with another Late Archaic mortuary complex, Old Copper culture, centered in Wisconsin. However, no sites (i.e., sets of spatially associated artifacts and features) have been found in the study area (Kellar 1993).

Archaic Tradition subsistence patterns exhibit changes from specialized diets focused on large game to more generalized diets, including the use of a wide range of mammals, fish, and amphibians, as well as plant materials (Kellar 1993; Mason 1981; Snow 1996). Chapman and Watson (1993:36) note that use and processing of many plant foods such as sunflower, sumpweed, and cucurbits, which originated during the Middle to Late Archaic, continue into the Historic Period. Models of Archaic settlement patterning suggest the strategic use of diverse plant and animal communities through the utilization of residential mobility and seasonal use sites within a cyclical settlement system (Anderson and Hanson 1988; Snow 1996; Struever and Holton 1979).

Such material complexes suggest increased residential settlement. No evidence of habitation structures is currently known, although artifacts such as millstones and heavy woodworking tools suggest greater sedentism (Mason 1981). Higher density refuse and the large, less portable artifacts support interpretations about the emergence of seasonal scheduling, or planned and permanent seasonal movement in which return to specific sites on an annual basis occurred (Snow 1996). This interpretation is consistent with Stafford (1994), which indicates a shift in subsistence-settlement strategy from foraging to logistic collection.

Changes in community patterning also likely occurred throughout the Archaic period. Increasing numbers of sites associated with the later parts of the period suggest an increasing population base and the increase in numbers of non-local artifacts implies a growing trade network. These factors, in combination with the emergence of early mortuary complexes, raise the possibility that the community pattern was shifting during the Archaic from functionally independent small bands to habitation groups reliant on a larger society for certain needs. Although it does not appear that these needs were significant, this interdependence set up a continuum for later cultural patterns. In addition, the appearance of regionally uniform, non-utilitarian artifact types (such as those associated with Red Ochre type burials) continued in certain Early Woodland patterns. These changes may be interpreted as precursors to the stratified societies apparent in the following tradition.

Materials ascribed to the entire Archaic Tradition have been found at multiple locations within INDU (Frost 2001; Lynott et al. 1998; Stadler 2001b). Stadler (2001b:8-9) documented the presence of an Early Archaic Lecroy or Kanawha bifurcate-stemmed point, dating somewhere between 7800 and 5800 BC (Bowen 1996; DeRegnaucourt 1991:99-108; Justice 1987:91-96; Sherwood et al. 2004), an Early Archaic Greenville Creek side notched (DeRegnaucourt 1991:40-41), and a reworked, stemmed Archaic point from testing of site 12PR597. He also documented another bifurcate point, identified with the Early Archaic, at site 12PR611 (Stadler 2002b). Frost (2001:91) reported four sites (12PR360, 12PR361, 12PR363, and 12PR497) as having projectile points that are similar to those described as Middle to Late Archaic in the surrounding Great Lakes area. Lynott et al. (1998) illustrates several points from excavations at 12PR295 typed to the Early Archaic (including one with a bifurcate base), and another that may be associated with the Late Archaic (DeRegnaucourt 1991:102, 107; Justice 1987:91-96). The assemblage from excavations at 12PR288 includes an Early Archaic bifurcate-stemmed point (Lynott et al. 1998). A series of sites recently examined along Dunes Creek have also provided evidence of Archaic occupation (Stadler 2001b; Sturdevant 2004c, 2005b, Sturdevant and Bringelson n.d.), including a Brewerton Side Notched point, associated with the Late Archaic (Justice 1987:115; DeRegnaucourt 1991:158).

Examples of Archaic points derived from INDU projects are depicted in Figure 4. Early Archaic points include Kirk Corner-notched (Figure 4.w.) and LeCroy cluster points (Figure 4.x,y,z,aa). A Raddatz Side-notched point (Figure 4.s.) is associated with the Middle

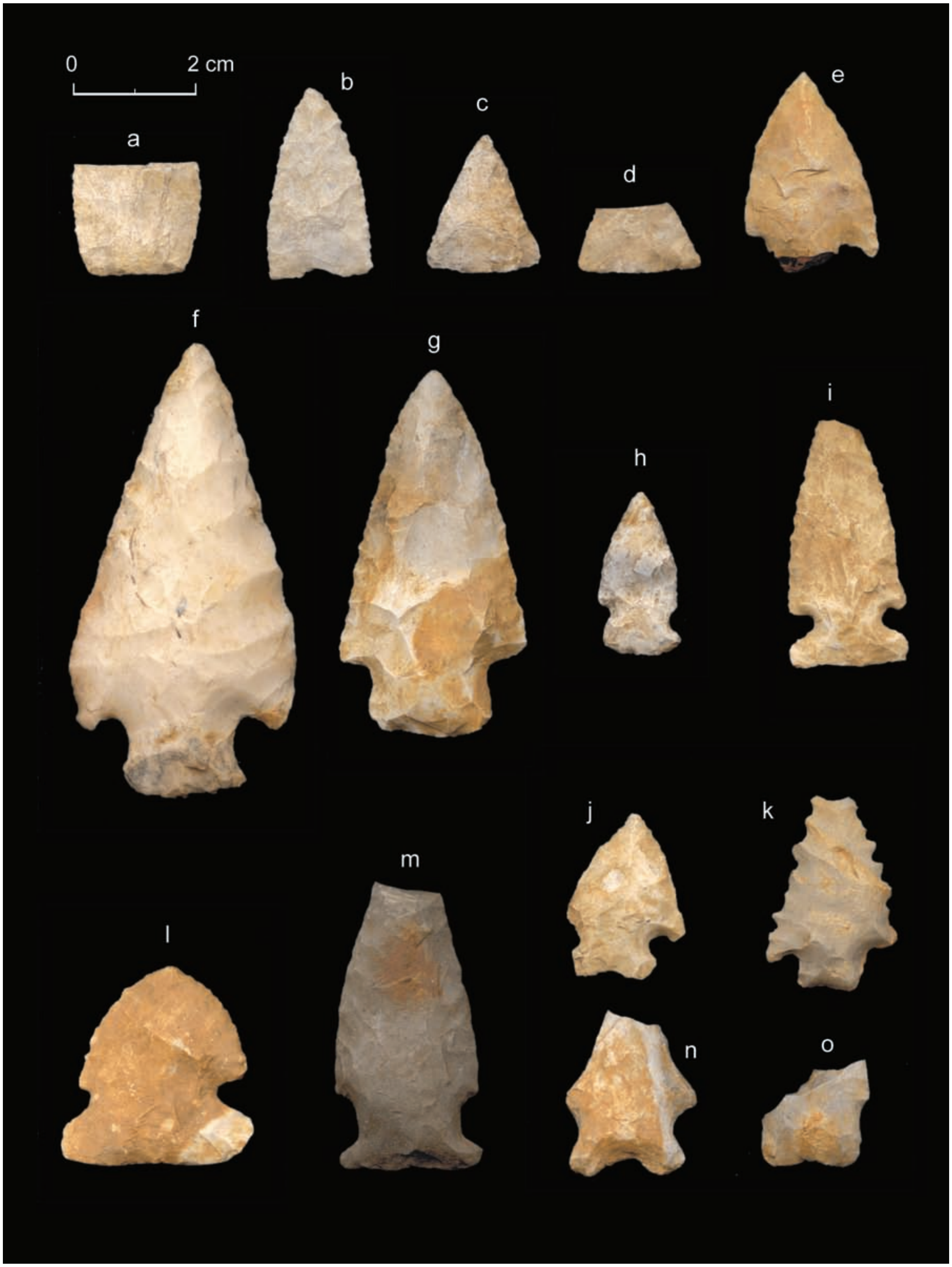

Figure 4. Example projectile points from INDU; from East Unit Campground project (see also Lynott et al. 1998).

Figure 4 (continued). Projectile points from INDU; from various Dunes Creek area projects.

Figure 4 Explanation: Taxonomic affiliation and date ranges associated with projectile points illustrated. See also Lynott et al. 1998 for discussion of materials from sites 12PR288 and 12PR295, Stadler 2001 and Sturdevant and Bringelson n.d. for 12PR597, and Sturdevant and Bringelson for 12PR611 and 12PR632.

id	site number	cmbs	Culture-Historic type and period	date range	references
a	12PR295	10-20	Jack's Reef Pentagonal	AD 500-1000	Justice 1987:215-217
b	12PR295	10-20	Triangle cluster (Late Prehistoric)	AD 800-Historic	Justice 1987:224-226
c	12PR295	0-10	Triangular cluster (Late Prehistoric)	AD 800-Historic	Justice 1987:224-226
d	12PR295	10-20	Triangular cluster (Late Prehistoric)	AD 800-Historic	Justice 1987:224-226
e	12PR288	50-60	Eva II (Early to Middle Woodland)		
f	12PR295	10-20	Dehli Barbed (Late Archaic-Early Woodland) or Affinis Snyders (Middle Woodland)	1300-200 BC or 200 BC –AD 200	Justice 1987:179; DeRagnaucourt 1991:234-238
g	12PR295	30-40	Kirk Stemmed (Early Archaic) or Genesee (Late Archaic)		Justice 1987:82-83
h	12PR295	10-20	Lamoka or Brewerton Side-notched (Late Archaic)	3000-1700 BC	DeRegnaucourt 1991:150-166
i	12PR295	20-30	Raddatz Side-notched (Late Archaic)		Justice 1987:64
j	12PR295	10-20	Palmer Corner-notched (Early Archaic)	7500-6900 BC	DeRegnaucourt 1991:44-48
k	12PR295	30-40	Kirk Stemmed (Early Archaic)	6900-6000 BC	Justice 1987:82-85
l	12PR295	30-40	Thebes Cluster (Early Archaic) or Big Sandy Side-notched (Middle Archaic)	8000-7000 BC or 6000-4000 BC	Justice 1987:54-56; DeRegnaucourt 1991:117-123, 131
m	12PR295	10-20	Big Sandy? (Early Archaic)	6000-4000 BC	Justice 1987:60
n	12PR288	plowzone	St. Albans Side-notched (Early Archaic)	6900-6500 BC	DeRegnaucourt 1991:94-98
o	12PR288	20-30	Kirk Stemmed (Early Archaic)	6900-6000 BC	DeRegnaucourt 1991:62-66
p	12PR632	10-20	Brewerton Corner-notched cluster (Late Archaic)	2980-12723 BC	Justice 1987:115-116
q	12PR632	50-60	Lamoka cluster (Late Archaic)	3500-1800 BC	Justice 1987:127-130
r	12PR611	30-40	Lamoka cluster (Late Archaic)	3500-1800 BC	Harrison 1966; Justice 1987:127-130
s	12PR632	40-50	Raddatz Side-notched (Middle Archaic)	6000-3000 BC	Justice 1987:67-69
t	12PR632	20-30	Table Rock Stemmed cluster (Late Archaic)	3700-1000 BC	Justice 1987:124-126
u	12PR611	30-40	Merom cluster (Late Archaic)	1600-1000 BC	Justice 1987:130-132; Winters 1969

v	12PR636		Brewerton Side-notched (Late Archaic)		
w	12PR632	10-20	Kirk Corner-notched (Early Archaic)	7500-6000 BC	Justice 1987:71-76
x	12PR632	50-60	LeCroy cluster (Early Archaic)	6500-5800 BC	Justice 1987:91-97
y	12PR632	0-10	LeCroy cluster (Early Archaic)	6500-5800 BC	Justice 1987:93-96
z	12PR611	40-50	LeCroy cluster (Early Archaic)	6500-5800 BC	Justice 1987:93-96
aa	12PR597	40-50	LeCroy cluster (Early Archaic)	7800-5800 BC	DeRegnaucourt 1991:99-108; Justice 1987:91-96

Archaic. Late Archaic points include Brewerton, Lamoka, Table Rock, and Merom cluster examples (Figure 4.p,q,r,t,u,v).

Although several Archaic sites are recorded in the park, the archeological character of these site occupations is still unclear because data concerning site type, habitations, diet, and seasonality are still quite limited at INDU. Once more data are available, the Archaic occupation of the National Lakeshore area will be better understood and more easily placed in a broader regional context.

Figure 5a shows the distribution of known late Paleoindian and Archaic components in relation to landforms and to site components from other time periods. Archaic, as well as most prehistoric archeological materials in general, correspond very closely with the dune ridges of the park, creating distributions of components running in a southwest to northeast trend. The elevation model displayed behind the site distributions provides an explanation for this pattern; the dune ridges are interspersed with low-lying areas that were swampy wetlands or ponds in the past. Six of the seven known Archaic components were found on the Calumet dune ridge (the second stabilized landform from the lake) or along the Dunes Creek drainage. This pattern suggests how Archaic subsistence and settlement practices interacted with the environment, and will be discussed further in conjunction with other traditions.

Woodland Tradition

The Woodland Tradition begins around 1000 BC in the Great Lakes area and is commonly divided into three periods. Though the specific date ranges vary by area, key changes in material culture and cultural manifestations around 200-0 BC and AD 400/500 form the bases for these intra-tradition divisions, and another set of differences after 1100-1300 BC separates the Woodland Tradition from subsequent periods (Garland and Beld 1999; Kingsley et al. 1999; Mason 1981; Stothers 1999).

Early Woodland

The Early Woodland Period extends from approximately 1000 BC to between 200 and 1 BC (depending on specific locale; see Fagan 1995; Garland and Beld 1999; Mason 1981; Schurr 1993) and has been defined by the appearance of distinct, constructed burial mounds, limited horticulture, thick-walled pottery, and other new artifact styles (Mason 1981:202). Early Woodland pottery is characterized as conical-shaped and thick-walled with coarse fabric impressions or cord marking on the interior and exterior surfaces, and has been given numerous type names throughout the Great Lakes region. It is generally referred to as Marion Thick in Indiana, Michigan, and Illinois (Griffin 1952a), and Leimbach Thick in Ohio (Shane 1967).

Early Woodland settlement is interpreted as somewhat more sedentary (or perhaps more scheduled) than that of the Late Archaic. It is assumed that pottery occurs more in situations where individuals do not expect to move on a frequent basis, or if they do travel, in situations where they expect to return. Although no burial mounds dating to this period are known from the Kankakee valley (Schurr 1993), evidence from the adjacent Illinois valley indicates elaboration of this trait over the Red Ochre and Glacial Kame complexes of the Late Archaic. An increased investment in elaborate items suggests a trend toward specialization of activities and thus increases in group size or interactions between groups – essentially, growing functional connections between people. Patterning of landscape use increases in the Early Woodland as well. Schurr (1993) notes that Early Woodland occupants selected particular settings, with sites in the Kankakee valley concentrated in lower areas of swamp, lacustrine, or riverine locales.

While material culture and landscape use suggest increased planning and complexity in Early Woodland community and settlement patterns, subsistence practices included broad-spectrum strategies, taking advantage of plants and animals of low-lying areas as well as the uplands (Schurr 1993). Cucurbit, sunflower, and nut remains have been recovered from Early Woodland sites in the study area. Garland (1990:418) found evidence for a broad range of floral and faunal materials in a multi-site study in southwestern Michigan, supporting a "diffuse foraging strategy."

Origins of Early Woodland in the study area are of interest to researchers. While it is possible that Early Woodland peoples migrated north and east from the Illinois valley into northwestern Indiana and southwestern Michigan, this interpretation is not necessarily accurate. Garland (1986), for example, sees in situ development of subsistence practices in southwest Michigan, specifically in terms of evidence of nut oil extraction. This practice appears to have been in place in the Late Archaic and was further facilitated by the use of pottery vessels. Garland and others (e.g., Schurr 1993) have noted that, while new artifacts occur in the Early Woodland, many Late Archaic forms carry over and continue to predominate. In particular, Garland (1986) notes that the basic point forms (notched and expanding-stem) remain. Overall, it appears that the four hallmarks of Woodland material culture mentioned above (plant domestication, distinct constructed burial mounds, thick-

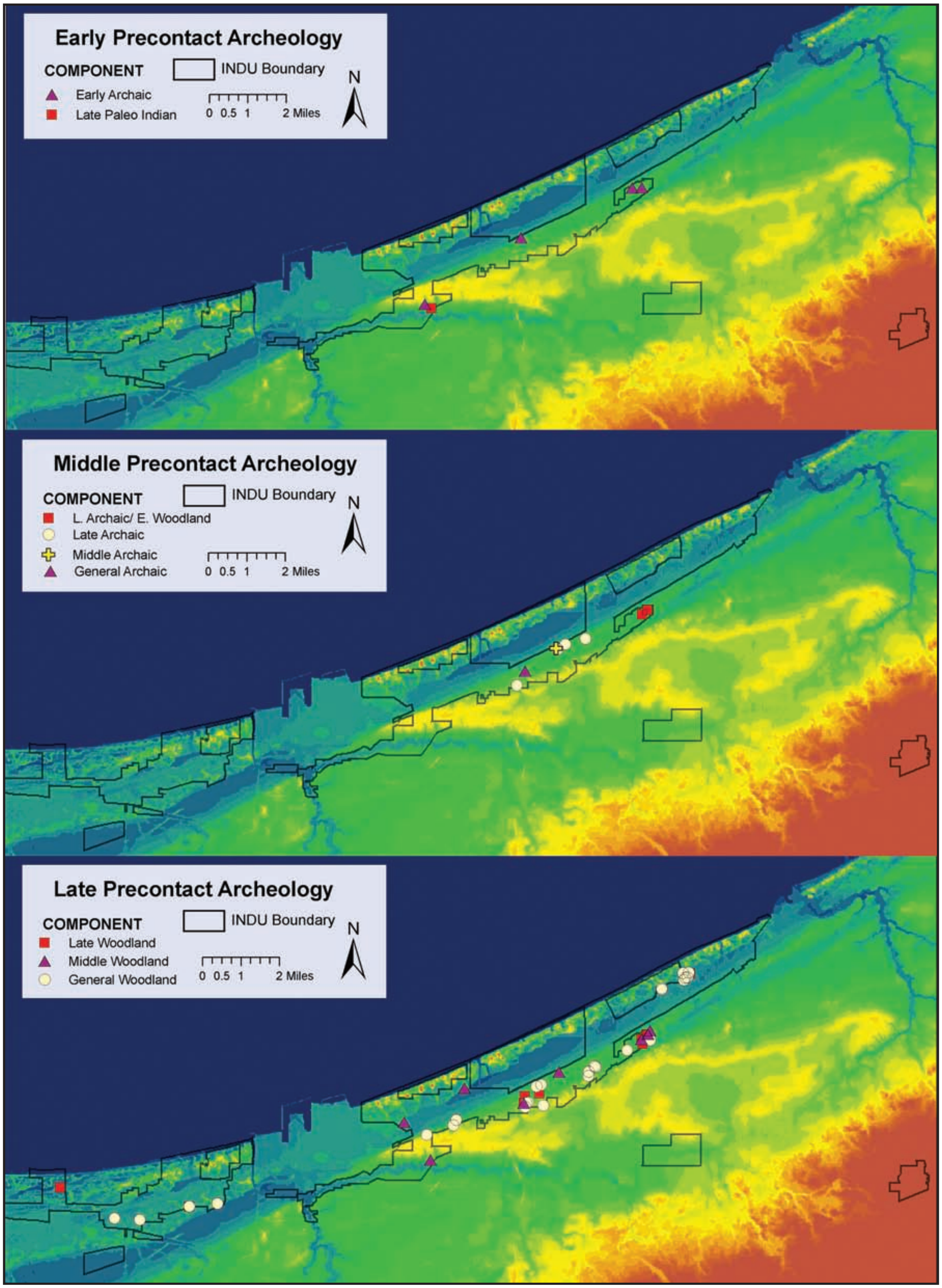

Figure 5. Distribution of archeological components and INDU boundary, over Digital Elevation Model. Top: early precontact site components, middle: middle precontact site components, bottom: late precontact site components.

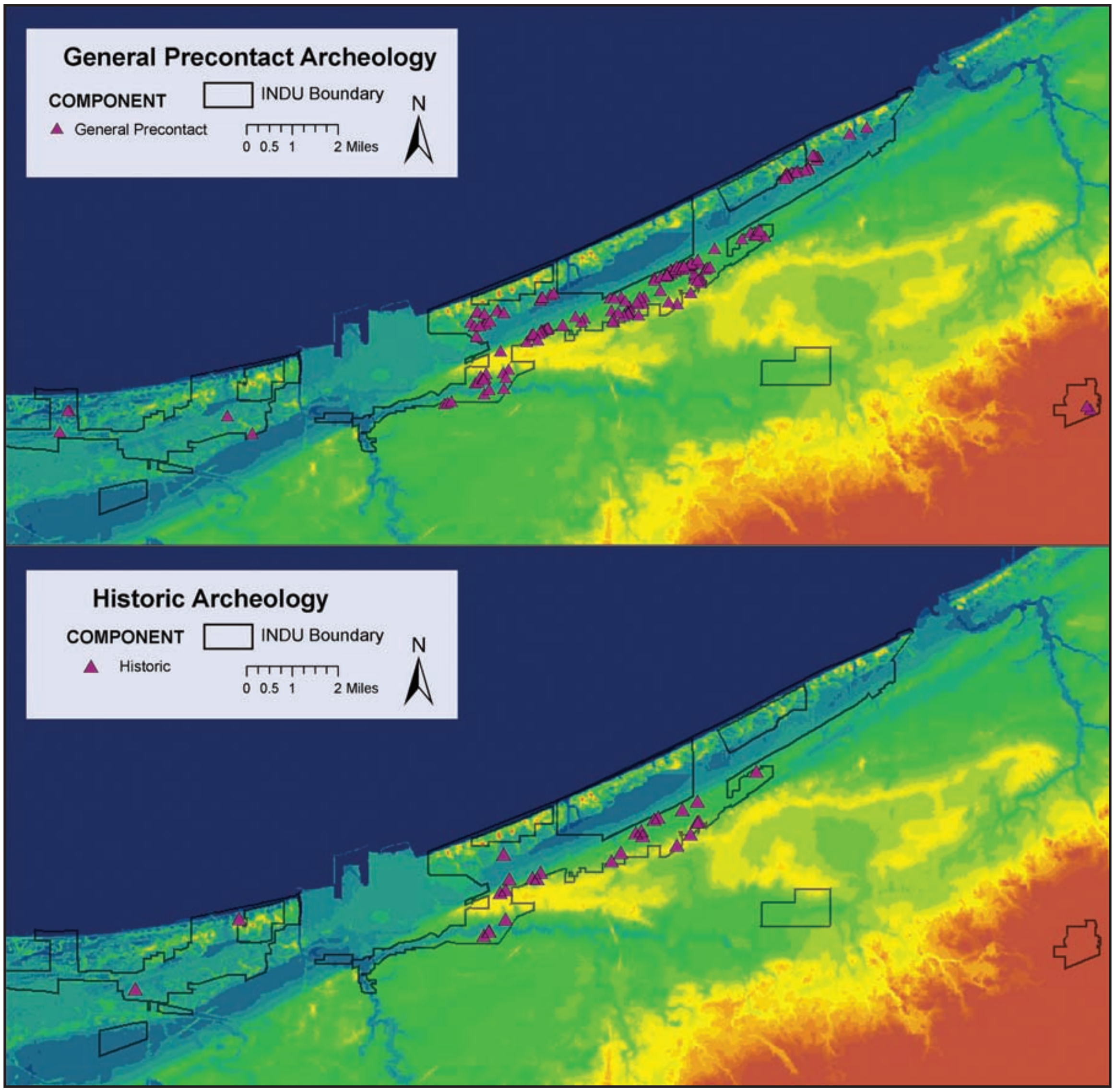

Figure 5 (continued). Distribution of archeological components and INDU boundary, over Digital Elevation Model. Top: general precontact site components, bottom: historic site components.

walled pottery vessels, and increased diversity of material culture assemblage) appear at various times throughout the period. The independent nature of the appearance of these groups of traits strongly suggests that “Woodland” culture developed more or less in situ, with multilateral influences in the form of migration, trade, and diffusion throughout this period (Mason 1981, Schurr 1993).

Middle Woodland

The Middle Woodland Period in northwest Indiana spans about 200 BC to 400 - 500 AD and is defined by the occurrence of Hopewell-like materials (Brown 1964; Fagan 1995; Mason 1981). Material culture of the Middle Woodland in the study area has been defined as the Goodall Phase (Brown 1964; Mangold 1997, 1998; Mangold and Schurr 2000; Quimby 1941). This phase is largely marked by the occurrence of conical burial mounds and groups of such mounds, frequently located near running water, with an elaborate set of mortuary goods accompanying burials (Quimby 1941). These materials often include copper celts, large chert blades and flake tools, bone tools, slate gorgets, worked mica, cut animal jaws and modified bear teeth, red ochre, river mussel shells, and pottery (Quimby 1941:139). Goodall pottery, as originally described by Quimby (1941), includes two essential types. One has limestone temper and fine-textured paste, a smooth to burnished surface, and very well executed decoration (including fine line incising, hollow-point punctating, and dentate rocker stamping) in separate zones around the rim and body. A second pottery type described by Quimby is grit tempered and coarser in both paste and surface texture. Some of this pottery is decorated in a way that suggests it is an imitation of the limestone-tempered vessels, but other examples are decorated differently, often distinguished by the method of execution and tools used. Common traits between the two pottery types include overlap in decorative techniques (incising, punctates, stamps, and impression), patterns, and shape. In general, pottery hallmarks of the Middle Woodland in the study area include elaborate decoration, defined by presence of multiple zones, decorative techniques, and design elements on single vessels. Middle Woodland pottery also differs from that of the early Woodland with decreased wall thickness, and the appearance of a greater variety of more elaborate (e.g., quadrilobate) vessel shapes.

Settlement during the Middle Woodland was relatively complex, targeting certain portions of the landscape. Schurr (1999) and Mangold (Mangold and Schurr 2000) note that Middle Woodland mound sites identified as part of the Goodall burial complex occur specifically on outwash terrace margins of the Kankakee, while associated habitation sites are found across the associated landscape. Mangold and Schurr (2000) group known sites into three categories. Mound groups and associated sparse habitation areas (see also Mangold 1997) generally lie along the Kankakee marsh margins, more substantial habitation sites bearing pottery occur on dunal islands, and more ephemeral camp or short term sites (consisting of points and/or lithic scatters) are found in morainal uplands. Land use practices changed throughout the Middle Woodland. The end of this period sees the essential abandonment of the Calumet lacustrine zone (adjacent to Lake Michigan) with concentration on raised areas within the Kankakee marsh. Mangold and Schurr (2000) suggest that this shift would have enabled inhabitants to exploit multiple ecological zones from a home base, obviating the need to move habitations during the wet season. These factors strengthen interpretations of increased sedentism in this later time.

It has been argued that later Middle Woodland mound groups were associated with permanent agricultural settlements (Faulkner 1972) tied to the introduction of maize, but more recent research indicates that other domesticated plants probably played a much larger role (Mangold and Schurr 2000). Evidence from the lower Illinois valley supports a diverse subsistence base. In addition to the curcurbits and sunflowers domesticated in the Early Woodland, intensified collection and perhaps domestication of smaller-seeded native annuals (Mangold and Schurr 2000), including goosefoot, knotweed, maygrass, little barley, and sumpweed is suggested. This scenario is plausible if not yet supported in the study area. A single bottle gourd seed from a mound context (Mangold and Schurr 2000) in the study area does not match the degree of evidence seen in the Illinois valley.

While early research (i.e., Quimby 1941) suggested that the Goodall Phase represented a northwest Indiana extension (or migration) of Havana Hopewell (Middle Woodland in the lower Illinois valley), more recent work does not necessarily necessarily support that view (Brown 1964; Mangold and Schurr 2000; McCord and Cochran 2003; Schurr 1997). In fact, many recent interpretations parallel those discussed above regarding early Woodland. In situ cultural development, with influence or diffusion of ideas from other areas is favored over migration. It is likely that differences in technique of mound construction and ceramic traits result from the in-place development of a northwest Indiana Middle Woodland Tradition (Schurr 1997).

In his survey of the archeology of Porter County, McAllister (1932) recorded 36 mound, village, camp, and burial sites and excavated two mounds. This work led him to conclude that a variant of Hopewell existed in Porter County. One of the sites reported by McAllister was “Mound Valley,” located near Tremont, just south of Indiana Dunes National Lakeshore. The site is described as having nearly one hundred mounds, which were later “leveled by the plow and their contents scattered” (McAllister 1932:12). Within INDU, Middle Woodland sites have been reported by several archeological surveys (Frost 2001; Honerkamp 1968; Lynott et al. 1998). Middle Woodland (potentially Hopewellian) materials such as rocker-stamped pottery and corner-notched projectile points are reported from sites 12PR295 and 12PR394 (Frost 2001:131-132; Lynott et al. 1998:232-237; see also Figure 6). Site 12PR295 also yielded Middle Woodland projectile points (Figure 4e, f). Along with these diagnostic materials, the Lynott et al. (1998:254) survey of the East Unit Campground produced at least two sets of radiocarbon dates from between 389 BC to AD 35 (calibrated at 2 standard deviations) for sites 12PR288 and 12PR295. Diagnostic materials and radiocarbon dating of these sites indicate a series of re-occupations beginning early in the Archaic and continuing throughout the Woodland Tradition. Research has demonstrated clear evidence of at least an ephemeral Hopewellian presence within INDU. However, more data are needed to link the INDU materials to the larger body of knowledge from core Hopewellian areas in Ohio, Indiana, and Illinois.

Late Woodland

The transition to Late Woodland in the study area occurred after AD 400 - 500 (Fagan 1995; Schurr 1999). Late Woodland groups are the first in the Upper Great Lakes region to clearly have an agricultural economy (Limp 1974:7), but the adoption of agriculture probably occurred after AD 1000. Doershuck (1984:21) suggests crop cultivation in the Indiana Dunes area would have been restricted to the easily tilled soils of the Kankakee and Calumet floodplains. However, Faulkner (1972) has noted that many floodplain locations coincided with wetlands and were thus not available for wide-scale cultivation until the Historic Period, when ditches were constructed to drain the wetlands, and that the deciduous forested, morainal uplands would have been best suited to emergent agriculture.

The primary material traits distinguishing the Late from the Middle Woodland period involve changes in pottery styles and mortuary complex (Schurr 1993), as well as the adoption of bow and arrow technology. Late Woodland vessel traits include a tendency toward more globular shapes with constricting necks, grit tempering, and cord marking (McCord and Cochran 2003; Schurr 1993). Decorative styles have been described for surrounding areas by various authors (e.g., Bettarel and Smith 1973; McAllister 1999; McCord and Cochran 2003; Schurr 2003). Albee wares, associated with the early Late Woodland in the Wabash valley area of west central Indiana (McCord and Cochran 2003), and Moccasin Bluff wares, found in extreme southwestern Michigan (Bettarel and Smith 1973; Cremin 1999) are very similar in appearance and timing. Appearing around AD 1050, these wares are typically cord-marked and grit tempered, with wedge-shaped, cambered (slightly collared) rims. Other wares, such as those associated with the very early Late Woodland Weaver phase in the Illinois valley and the Brems phase at Moccasin Bluff in southwestern Michigan (Bettarel and Smith 1973; Schurr 2003) have more smoothed-over cordmarking, and exhibit decorations around the rim that are executed with cord-wrapped sticks (Schurr 1993). The distribution of Late Woodland ceramic nomenclature is presented in Table 1.

Mortuary practices still incorporated mound-building, which at times proved to be quite involved, but the connections to the Hopewell Interaction Sphere and regional political complexity seem to have dissipated and mounds were commonly integrated into the natural topography near habitations. Faulkner (1972) describes Late Woodland burial mounds in the Kankakee valley south of INDU, and mentions that other similar inhumations are also found in habitation sites of this period. Artifacts included with burials, such as platform and elbow pipes, slate pendants, and bone implements suggest a connection with Late Woodland cultures to the west (in Wisconsin) and to the northeast (Ontario and New York) (Faulkner 1960; 1972:154). The form and content of these mounds indicate burial practices were more homogeneous or egalitarian; the tombs are not as elaborate (Faulkner 1972), and they interred greater numbers of people instead of the elite few (Mason 1981).

Site density in the study area increases during the Late Woodland, reflecting a growing but more dispersed population with greater numbers of small campsites replacing

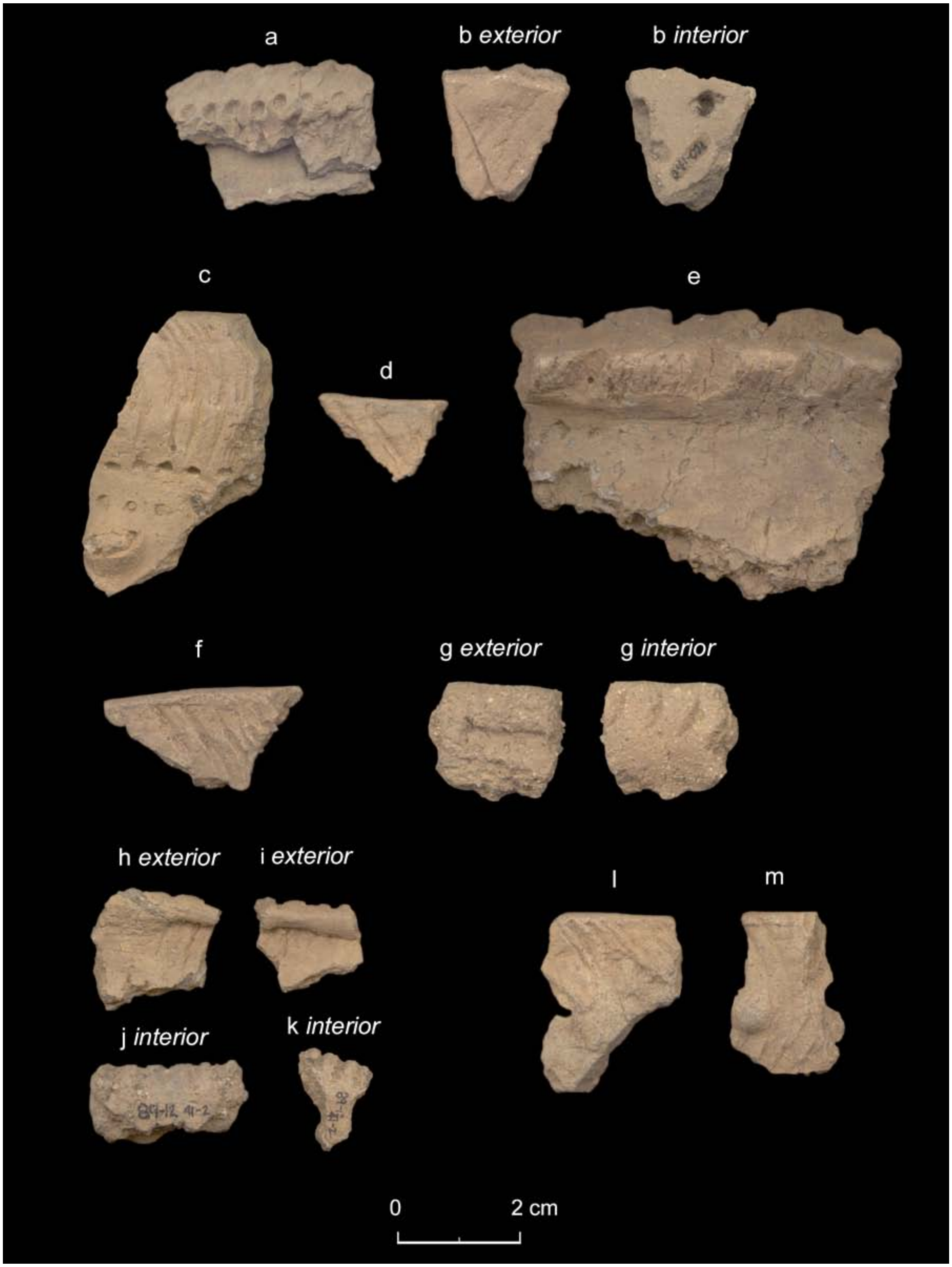

Figure 6. Diagnostic pottery from INDU. Identification information presented in Table 10.

Figure 6 (continued). Diagnostic pottery from INDU. Identification information presented in Table 10.

Figure 6 (continued). Diagnostic pottery from INDU. Identification information presented in Table 10.

Figure 6 Explanation: Examples of diagnostic pottery from INDU. Each letter indicates a separate sherd or group of conjoined sherds. All views of vessel exterior surface unless otherwise noted. The following table provides provenience and descriptive information for each vessel represented here. Culture historical interpretation provided in Table 10. (See also Lynott el al. 1998.)

Object ID	Identifier	State Site Number	Description
a	8541	12PR296	Thickened rim; cord-wrapped stick impressions on top of lip, cord-roughed on collar, small punctates around collar base; grit temper; gray core with tan exterior.
b	10132	12PR295	Direct rim with flattened lip; smoothed cord-marking under incised line and faint boss; grit temper; gray core with tan exterior.
c	PR 394_901_001	12PR394	Direct, incurving rim; zoned decoration: rocker stamping, two rows of tool impressions (punctates), boss; grit temper; gray core with tan exterior.
d	10679	12PR295	Direct rim with flattened lip; diagonal incised lines; grit temper; gray core with tan exterior.
e	10926	12PR295	Thickened rim with notches on collar and lip; grit temper, gray core with tan exterior.
f	10928	12PR295	Direct rim with flattened lip; diagonal incised lines on exterior, red pigment on interior; sandy paste; gray core with tan exterior.
g	PR 394_401_004	12PR394	Direct rim with rolled lip, fingernail impressions on interior; sandy paste; tan.
h-k	10912	12PR295	Direct rim with rolled lip; smoothed cord-marking under lip on exterior; cord-wrapped stick impressions on top-interior of lip; dark gray sandy paste with tan exterior.
l-m	10929	12PR295	Direct rim, smoothed lip; rocker-stamping, bosses; grit-tempered gray paste with tan exterior.
n	PR_303_404_ 002	12PR303	Thickened rim; smoothed cord-marking; gray, grit-tempered paste with tan exterior. Red pigment on exterior surfaces.
o	PR_314_406_ 001	12PR314	Direct rim; slightly smoothed cord-marking, punctates; tan, grit-tempered paste.
p	Vessel 1	12PR297	Thickened rim, smoothed cord-marking; gray, grit-tempered paste with tan exterior.
q	10883	12PR295	Direct rim, eroded cord-marking; grit-tempered (gray?) paste with tan exterior. Red pigment on exterior surfaces.
r	N/A	12PR297	Direct, cord-roughened rim with diagonal tool impressions; constricted neck; grit-tempered tan and gray paste.
s	PR_298 Vessel 2	12PR298	Direct rim; distinct cord-marking on exterior (smoothed cord-marking on interior) surface, two rows of punctates around neck and shoulder (conical body shape); sandy tan and gray paste.

the less numerous permanent villages associated with the Middle Woodland along the Kankakee valley (Faulkner 1972; Mason 1981; Quimby 1941). In addition, more activity is evident on the Calumet Lacustrine Plain closer to the park, although the Kankakee marsh was still more heavily used (Faulkner 1972; Schurr 2003).

Changes in settlement are tied to subsistence shifts. Moving into marshy areas allowed exploitation of a greater variety of secondary resources (Schurr 1993, 2003) and apparent reservation of uplands for hunting also maximized those resources. Maize horticulture became significant after AD 500 (Schurr 1993) and by AD 1000 reached its maximum contribution to subsistence (Mason 1981), although broad-spectrum activities continued to play an important role. McCord and Cochran (2003) note that the occupation of floodplain planting sites facilitated utilization of wild and cultivated plants, as well as a wide variety of faunal resources. The widespread appearance in the record of thin, corner-notched points suggests the addition of the bow and arrow to the toolkit (Nassaney and Pile 1999). In comparison to the spear and atlatl, this technology would have fostered great success in hunting a broad variety of relatively small solitary animals common in marshy woodland settings.

The Late Woodland seems to reflect a shift in subsistence and settlement, with continuity in population from the Middle Woodland. The observed changes are more likely the result of a collapse or break in the Hopewell trade network than a migration or replacement of populations. The ultimate fate of the Late Woodland varies from locale to locale. In many parts of the Midwest, and in a large part of Indiana, Upper Mississippian assemblages replace those associated with the Late Woodland at around AD 1100. However in the study area proper (i.e., northern Lake, Porter, and LaPorte counties), the Late Woodland may continue into the protohistoric period. Recent archeological studies of the East Unit Campground (Lynott et al. 1998) and other selected areas (Frost 2001) have demonstrated the presence of numerous Late Woodland sites within INDU. Radiocarbon dates from the East Unit Campground indicate Late Woodland components starting at AD 645 and continuing up to AD 1455 (calibrated at 2 standard deviations) (Lynott et al. 1998:254; see Table 2 for the raw 14C dates). Late Woodland assemblages from sites within the park generally consist of grit-tempered, cord marked ceramics, as well as triangular projectile points (see Figure 4a-d), bifaces, lithic debitage, scrapers, and fire-cracked rock. Frost (2001:131-132) illustrated Late Woodland ceramic examples from 12PR314 and 12PR303, as well as numerous side- and corner-notched Late Woodland projectile point forms. Other Late Woodland materials are illustrated for assemblages from 12PR297 and 12PR299 (Lynott and Frost 1997). Figures 4 and 6 also show chipped stone and ceramic examples from INDU.

Woodland materials have been found on all upland settings except recent unstabilized shoreline dunes at INDU. However, the highest proportion of Woodland sites exists on the Tolleston dune ridge. Twenty of 33 known Woodland components derive from this setting, with the remaining 13 split among all other dune ridges and lower-lying areas. As with the Archaic components, there may be environmental variables influencing this pattern. Perhaps resources on the Tolleston ridge during Woodland times were amenable to settlement and subsistence typical of the Woodland Tradition. This and alternate explanations are explored in Chapter 5.

Mississippian Tradition

The Mississippian phenomenon looms in the late prehistory of North America as a large-scale society with influence seen in the archeological record across the continent. The "core," – or Middle – Mississippian area, located in the American Bottom region around the lower Illinois River and associated confluences, is characterized by material culture interpreted to reflect a much more stratified society than that represented by Late Woodland assemblages. Classic Middle Mississippian settlements are characterized by the presence of one or more large, flat-topped temple mounds, oftentimes accompanied by a "plaza" or empty area, surrounded by multiple domestic structures. Mortuary patterns suggest elite status of certain community members relative to others; craft specialization is evident in the material culture, and the connection of large urban centers to smaller "peasant" outposts is inferred as well. In addition to mounds, other large-scale earthworks are known. Palisade structures, or fortifications, are not uncommon for Mississippian villages. Subsistence for Mississippian occupants had a greater focus on corn agriculture than Late Woodland. It appears that the smaller settlements in proximity to the large villages served as agricultural satellites for the society.

Mississippian lifeway interpretations contrast with those of the Late Woodland in several ways. Late Woodland settlement was apparently more nucleated, in that all members of a community lived in the same settlements or had direct contact with each other. Settlement sites are consistent with hamlets and small communities, with diffuse subsistence strategies that relied on river valleys and lake margins (Schroeder 2004:314). This stands in contrast to interpretations of dispersed and stratified settlement for Mississippian society largely dependent on corn agriculture, a kind of focal economy. Inferred economic differences also divide the two: Late Woodland economies are interpreted as redistributive or reciprocal (or tribal-scale [Schroeder 2004]), in which members of the community all contribute to subsistence and each receives goods as needed. In contrast, Mississippian economies are interpreted as approaching market exchange or hierarchical redistribution, with taxation by elite central members of lower-strata outpost dwellers for agricultural products. This is consistent with Mississippian/Woodland differences in the level of stratification apparent in burial patterns, as well as amounts and kinds of non-essential goods. The record suggests that high amounts of Mississippian labor were spent on non-subsistence related activity, such as production of highly specialized craft items and large scale earthworks, benefits of which were principally funneled to a small proportion of the population.

Although little evidence currently suggests Mississippian occupation within INDU boundaries, such occupation is evident in surrounding areas. Given that this cultural tradition was contemporaneous with the Late Woodland Tradition (widespread in the park), the Mississippian phenomenon is very relevant to late prehistory here. Given also the complex nature of the Mississippian and the discussion surrounding it, it is important to outline relevant aspects for the southern Lake Michigan region.

The Upper Mississippian

While the classic Middle Mississippian is associated with the suite of material culture and interpreted social traits discussed above, the Upper Mississippian, radiating from the upper Mississippi drainage in parts of Iowa, Minnesota, Wisconsin, Illinois, Indiana, and Michigan does not precisely match that pattern. While a few settlements in this region (e.g., Aztalan – discussed below) exhibit architecture and material culture traits easily associated with the core suite of characteristics, many others identified as Upper Mississippian exhibit only a part of this suite. There is no clear definition of Upper Mississippian and thus researchers diverge in identifying individual assemblages and descriptions of the phenomenon overall.

For the region surrounding Indiana Dunes, the Upper Mississippian period is dated from around AD 1050 or 1100 up to direct European contact with the native Great Lakes cultural groups (Cremin 1999; McAllister 1999; Schurr 1993), which is defined here as the expedition of Robert Cavelier de La Salle in 1679. The presence of shell-tempered pottery and evidence of greater reliance on maize horticulture distinguish Upper Mississippian assemblages from those of the Late Woodland. This period is also associated with a variety of small, triangular-shaped projectile points and extensive earthwork architecture distinct in form from that associated with the Middle Woodland. Pottery characteristics are however, by far, of broadest use in distinguishing Upper Mississipian assemblages. Identification of maize-based agriculture, where it did occur, is possible only with the recovery of degradable artifact classes and the synthesis of multiple categories of artifacts, the triangular arrow points are not distinguishable from those found in Late Woodland assemblages and no classic Mississippian earthworks are recorded in the northern Lake, LaPorte, or Porter counties of Indiana.

Upper Mississippian pottery assemblages are distinguished from Woodland wares primarily by the presence of shell temper and diversity of vessel shape, decoration, etc., although not necessarily exclusively (see Bettarel and Smith 1973). Upper Mississippian ceramics may be internally differentiated based on surface treatment and design elements. The Fisher complex for example, an Upper Mississippian group of materials (containing both shell and grit tempered ceramics) found in Lake County south of INDU, contains wares with cord-marked surfaces. Earlier Fisher wares have curvilinear design elements applied with a fine line incising technique, while later Fisher wares are distinguished by trailed lines and the presence of punctates in the decoration (Faulkner 1972). Virtually identical ceramics in southwestern Michigan are identified as Moccasin Bluff wares and are associated with the Moccasin Bluff phase (Bettarel and Smith 1973; McAllister 1999; Schurr 2003). Another relevant Upper Mississippian complex, termed the Huber complex (Faulkner 1972), is centered west of the park area in northeast Illinois. Huber wares are distinguished by their smoothed surfaces, as well as the presence of rectilinear design elements and the use of incised trailed lines. These wares also occasionally display punctates (Schurr 1993). Huber wares occur in assemblages from an area surrounding southern Lake Michigan and may also be termed Berrien Ware, characteristic of Berrien phase assemblages in southwestern Michigan (McAllister 1999).

Two main habitation types characterize the Upper Mississippian period: semi-permanent villages with large, multi-family houses, and more ephemeral camps with one or two single-family “wigwam” style dwellings (Schurr 1993). The villages appear to have been used during the spring and fall, with cemeteries often located within or nearby. The camps are also interpreted as seasonal and are located in the Calumet Lacustrine plain, the Kankakee marsh and surrounding forested and grassy uplands (Schurr 1993).

Subsistence traits distinguishing the Upper Mississippian are tied to maize horticulture. This tradition is the first in this region to exhibit fully adapted maize production and cultivation of domesticated plants (Schurr 1993; 2003). While Mississippian strategies appear to have been more focused on domesticated plant resources than ever before, hunting and collecting of wild foods still plays a significant dietary role; area occupants used the Kankakee marsh as well as similar parts of the Calumet Lacustrine Plain for seasonally-available resources.

Oneota

The Upper Mississippian in northwest Indiana is identified by some as a regional variant of Oneota, a cultural pattern centered on the upper Mississippi valley (Hall 2000; Schurr 1993), although there is strong evidence to suggest that Oneota evolved in the Upper Midwest, independently of Mississippian developments in the American Bottom (Henning and Thiessen 2004:384-385). In either case, the strong cultural (ceramic) discontinuities displayed between either complex and that of the Late Woodland suggest that both Upper Mississippian and Oneota represent the movement of different peoples (i.e., migration and displacement or amalgamation) into this area from the west and/or south.

The Oneota phenomenon is identified in an area centering in Wisconsin, Minnesota, and Iowa, and extends from approximately AD 950 to contact in parts of its distribution. There does not appear to be a consistent interpretation regarding Oneota’s relationship with other regional traditions. Some consider Oneota a sub-type of the larger Upper Mississippian Tradition (e.g., Schroeder 2004), while others consider it a separate population (e.g., Overstreet 1997). Identification of individual assemblages as “Oneota” is sometimes subject to debate, though they are generally described as containing Mississippian-style pottery, but in the context of Late Woodland style settlement and subsistence. Oneota pottery is often shell-tempered, with rim and shoulder decoration including curvilinear or geometric trailed designs (common Mississippian traits), with the addition of chevrons and punctates (Overstreet 1997). Oneota assemblages are more commonly identified in upland settings, as opposed to the lower-lying settings of Mississippian agriculturally based settlement. This combined ceramic tradition and settlement/subsistence system appears to emerge and evolve in-place, strengthening arguments of diffusion over migration from the Middle Mississippian area, at least for this set of Upper Mississippian material.

Late Prehistoric Complexities

The terms “Middle Mississippian,” “Upper Mississippian,” “Oneota,” and “Late Woodland” carry great, if often implicit, meaning to prehistorians, and ultimately influence interpretations they make about the past. Concepts of political structure, power relationships, and continent-wide interaction and movement all come down to seemingly minor distinctions in material culture at the local level.

Just as researchers debate the essential characters of Middle versus Upper Mississippian and Oneota assemblages, they also debate the nature of the relationships represented in the record. These generally range from “invasion” scenarios in which Upper Mississippian settlements represent colonial outposts and control of a hinterland by the core Mississippian polity, to “refugee” scenarios in which Upper Mississippian settlements represent exiles cut off from the core area, to “in-situ development” interpretations, in which Mississippian style traits result from diffusion or trade instead of migration (e.g., Emerson 2000; Gibbon 2000; Henning and Thiessen 2004; Overstreet 1997; Richards and Jeske 2002; Schroeder 2004; Schurr 2003).

This range of interpretations is directly tied to a diversity of ways in which the Upper Mississippian is represented in the record. In some cases, as at Aztalan, a large number of Mississippian traits occur, and the assemblage is dominated by such traits. In other assemblages, however, Mississippian style traits co-occur with Late Woodland traits. Finally, certain cases occur in which a site might be interpreted as simply Late Woodland but for the occurrence of a single Mississippian-style trait. Ceramics are most often at the core of this discussion. The distinctive Mississippian types include shell temper, sometimes in conjunction with distinctive vessel form and embellishments. In addition, certain cases of Upper Mississippian designation occur due to the identification of “Mississippianized” pottery, in which Mississippian decorative traits or vessel forms co-occur with Late Woodland technology (i.e., grit temper), such as Langford ware seen in the Chicago area (Faulkner 1970; Schroeder 2004). All of this can create a confusing atmosphere in which to interpret Late Prehistoric social configuration.

Understanding Late Prehistory in the Lake Michigan Region.

In order to examine the interplay of the various traits considered part of the Mississippian suite, it is helpful to examine the Late Prehistoric record in a larger regional perspective. Several assemblages located around Lake Michigan are summarized here, with a focus on the interplay of ceramic or stylistic traits with material culture tied to subsistence and settlement. Figure 7 shows the distribution of the sites discussed here.

INDIANA DUNES NATIONAL LAKESHORE

The Skegemog Point site (20GT2) provides an example of a Late Woodland site located on a lake just inland from Lake Michigan's far northeastern shore, some 250 miles from INDU's border. Hambacher (1992) provides detailed descriptive and analytical information on this assemblage, summarizing the ceramic component in three wares. Bowerman ware is tied to the early Late Woodland period, spanning AD 600-1000, and is characterized by fine cordmarking, short straight rims, and decoration (when present) using punctates. Hambacher relates these materials to Wayne ware of eastern Michigan and Allegan ware of western Michigan. Skegemog ware is also associated with the early Late Woodland, spanning AD 800-1000. These materials exhibit medium to coarse cordmarking, short straight rims, and lip surface decoration. Approximately one-third of the lip top, interior, or exterior surfaces of this ware show cord-wrapped paddle or other tool impression. This ware also has examples of collared rims. Hambacher finds that Skegemog wares show affinity with Mackinac wares to the north as well as Spring Creek wares to the south.

Thirty-two features were excavated and recorded at the Skegemog Point site, most of which are characterized as shallow basin-shaped hearths, though post-holes and rock concentrations abound as well. Only two sets of post-holes might represent (small circular) structures, oriented around hearth features. Although subsistence information is unavailable for this site, it is assumed to follow the Woodland-like pattern of broad-based utilization of wild food sources. Hambacher's analyses led to the conclusion that this site represents a resident population in this region during the Late Woodland; ceramic geographic style boundaries cannot be completely accounted for by ecological differences.

The Spring Creek Site (20MU3) is located near Lake Michigan's central-eastern shore in the Muskegon River Valley. It is interpreted to represent the remains of a single, short, intense occupation (Fitting 1968), dating to approximately AD 1000. Feature types excavated include sherd concentrations, fire pits, storage pits, and large dark areas with concentrations of artifacts. The ceramic assemblage is markedly homogeneous. Fitting (1968) notes that, of the 966 minimum vessels represented, all but twelve are similar enough to evoke interpretations of a single producer. Fitting does outline three essential rim profiles, which correlate with other trait dimensions: collared vessels, which tend toward coarse cordmarking, thicker walls, and absence of decoration; thickened lip vessels, which show disproportionate frequency of vertical cordmarking and interior rim decoration; plain-rimmed vessels tend to be smaller, have finer cordmarking, and lack lip or interior rim decoration (Fitting 1968:23). Fitting notes the similarity of his "Spring Creek Collared" (the first type described) to ceramics distributed widely during the early Late Woodland through Michigan, Illinois, Indiana, and even into Missouri.

The Spring Creek faunal assemblage is small in proportion to other artifact classes and is very low in number of species represented. Deer comprise the main portion of this assemblage, leading Fitting (1968:68) to conclude that the group represented by this assemblage were focused on a narrow range of wild foods and relied largely on agriculture. No direct evidence of agriculture is found in the assemblage, so the author allows for the

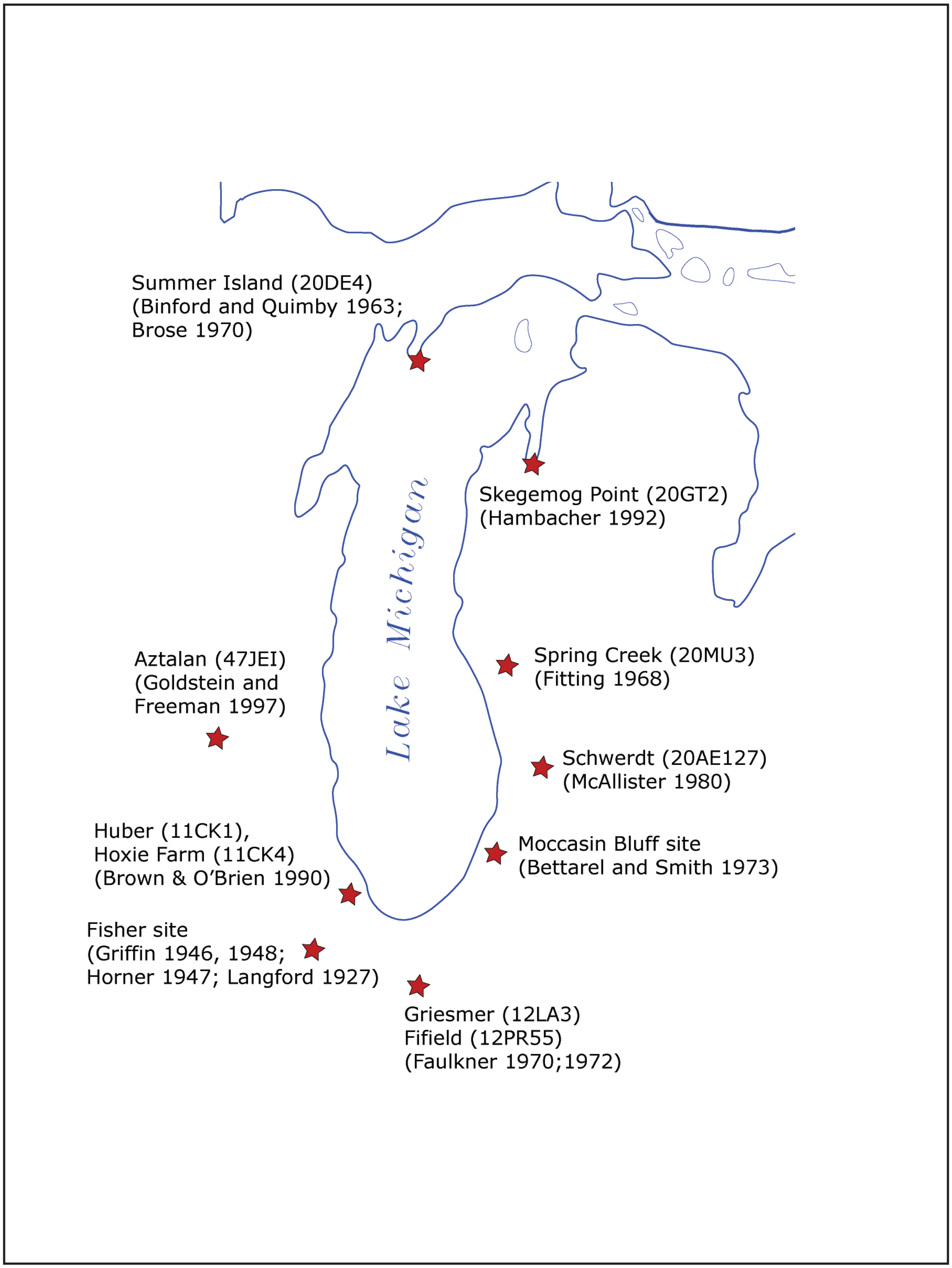

Figure 7. Locations of Lake Michigan - area sites discussed in text.

exploitation of wild rice as well. In any case, the sheer quantity of ceramics and broad array of lithic artifacts, as well as the number of fire and pit features is consistent with a village occupation.

The Schwerdt Site (20AE127), located in Allegan County, Michigan, is described as a "mixed shell and grit tempered assemblage [and a] component of a local Upper Mississippian development...the Berrien Phase" by McAllister (1980:abstract page). Extensive excavations by Western Michigan University field schools during 1977 and 1978 revealed 46 features, including roasting pits (McAllister 1980:120), other pits, hearths, and postmolds (Adkins 2004:71). A broad variety of faunal and floral materials in the assemblage, in conjunction with the features located, suggest the Schwerdt Site represents a seasonal encampment at which activity focused on resource extraction and processing. The Schwerdt site is apparently classified as "Upper Mississippian" on the basis of its shell-tempered ceramics; Moccasin Bluff ware (grit-tempered, cord-marked materials interpreted to span a temporal range of AD 950-1600) account for 55 identifiable vessels (1453.6 grams), while Huber ware (shell-tempered materials with trailed decoration similar to Oneota materials) account for only 12 vessels, or 696.2 grams. The vast majority of the ceramic assemblage is composed of untyped body sherds, most of which have grit temper, with only 4.8% (by weight) showing evidence of shell tempering. In summary, the Schwerdt site is characterized by lifeways typically ascribed to Woodland society and a majority of Late Woodland style pottery. It has, however, been characterized as an Upper Mississippian occupation.

The Moccasin Bluff site, located along the St. Joseph River in Berrien County, Michigan, serves as a prominent example not far from Lake Michigan's southeastern shore, approximately 20 miles from INDU. A large number of pit-type features were recorded here, including storage and/or trash pits, fire pits, hearths, and small shallow pits (filled with charred corn and cobs, perhaps used as smudge pits for hide-tanning) (Bettarel and Smith 1973:27-28.) Excavators found no direct (i.e., structural) evidence for dwellings, but the concentration of pit features, combined with faunal evidence for year-round occupation, led to the assumption that Moccasin Bluff represents a sedentary village settlement.

A sizable ceramic assemblage, including both shell and grit-tempered pottery, is recorded. Bettarel and Smith (1973) term the grit-tempered ware "Moccasin Bluff ware," stating it accounts for approximately 87% of the total assemblage (by count). Component types of the ware include the types Moccasin Bluff Cordmarked, Moccasin Bluff Collared, Moccasin Bluff Modified Lip, Moccasin Bluff Impressed Exterior Lip, and Moccasin Bluff Plain Modified Lip. These types are outlined in Appendix 1 here, but are mainly distinguished from each other by presence of distinct versus smoothed cordmarking on the vessel body and rim, and the way in which the rim and lip were decorated. The second ware identified in the Moccasin Bluff assemblage is termed "Berrien Ware," and accounts for some 13% of the assemblage. This group of sherds is subdivided based largely on vessel shape: sharpness of the break at the vessel shoulder, and length of the neck. Bettarel and Smith (1973:141-148) liken Berrien Ware to the Huber ceramics identified in assemblages in the Upper Illinois and Kankakee valley (more on this below), speculating that these materials were produced by Oneota groups, while the Moccasin Bluff (grit-tempered) materials were products of another Central Algonquian group (e.g., Kickapoo, Sauk and Fox, Mascouten, or Potawatomi).

The Kankakee Valley, just south of INDU, is the location of several known assemblages associated with mounds and shell-tempered ceramics, widely identified as Upper Mississipian. The Griesmer site (12LA3) is situated in southwestern Lake County, Indiana on a sand ridge bordering the Kankakee River. The Kankakee setting here has historically been considered a deep marsh, offering a wide variety of wild resources as well as fertile soil in nearby prairie (Faulkner 1972:13). Faulkner reports 77 features at Griesmer, most of which were identified as Upper Mississippian cache, storage, cooking, or trash pits. Floral and faunal analyses are consistent with broad resource extraction practices not unexpected at this ecotone setting. Deer, muskrat and beaver, as well as a variety of fowl, amphibians and fish are identified in the assemblage. Unfortunately, feature fill was not floated to allow for systematic collection of small seed and other botanical remains, but several wild fruit and nut specimens were identified. The largest food plant identified, though, was white water lily root, which is known historically to have been roasted or boiled for its nutritional value. No corn was identified at Griesmer.

Ninety-four post molds recorded at Griesmer suggest structures of some sort, but their lack of solid patterning, relative scarcity, and the lack of other structural evidence leads to the conclusion that dwellings here were of a moveable, temporary nature (e.g., wigwam). This and floral evidence suggest a summer occupation here.

Late Prehistoric ceramics recovered during excavation include a small amount of grit-tempered (Langford) ware, but the vast majority of Late Prehistoric sherds are represented by shell-tempered pottery. Fisher wares, similar to Langford wares in form, surface treatment (both are cord-marked), and decorative treatment are known via stratigraphic relationships elsewhere (Griffin 1946; 1948) as the earliest shell-tempered ("Upper Mississippian") pottery in this region. Huber wares, shell-tempered non-cordmarked pottery (interpreted by some as representative of Oneota occupance), comprise the most significant portion of the assemblage. Faulkner (1970; 1972) uses stratigraphy at the Fisher site (see below) as well as spatial analysis at Griesmer to conclude that the two shell-tempered wares represent two closely-timed yet distinct Upper Mississippian occupations, sharing the same lifeways.

Occupation here is interpreted as several nuclear families reusing this locale over multiple seasons in order to take advantage of wild foods available in and around the marsh. It is assumed that occupants vacated this site in the fall, moving to upland villages for agricultural harvest.

Faulkner also reports on the Fifield site (12PR55), set along a tributary of the Little Calumet River just south of INDU's East Unit. Noting the presence of nearly 50 features including roasting, storage, and refuse pits and limited post mold patterns suggesting round-walled structures, he interprets this as a domestic site. Just as with Griesmer, faunal and floral evidence suggest broad-based subsistence reliant on wild sources. Corn is also absent from this assemblage. Ceramics include grit-tempered Langford ware in small quantities (n=9 sherds), with the overwhelming majority of the assemblage comprised of Fisher wares (n=2434). This preponderance of shell-tempered ceramics, coupled with the occurrence of copper ornaments and other Mississippian-style portable artifacts, supports an Upper Mississippian interpretation for this occupation. Faulkner interprets Fifield as a large semi-permanent settlement, occupied either as a winter hunting camp, or perhaps during summer as well.

The Fisher Site, located in Will County, Illinois at the confluence where the Des Plains and Kankakee Rivers form the mouth of the Illinois, has a long history of investigation (Griffin 1946, 1948; Horner 1947; Langford 1927) and serves as the type site for the Fisher wares. Investigations during the first half of the 20th century recorded 12 mounds and some 50 house pits (Griffin 1948). Stratigraphy at this site suggests an earlier temporal placement for the shell-tempered Fisher Trailed and Fisher Noded ceramic types, superseded by occupation debris including grit-tempered Langford wares (Langford Trailed, Corded, and Noded). The latest occupation included Langford Plain ceramics. Griffin (1948:126) ties ceramic data to the entire cultural system, interpreting evidence at the Fisher site to indicate a shift during the Late Prehistoric in this area away from settled horticulture characteristic of Middle Mississippian occupations, toward mixed hunting/ horticultural economy associated with late Woodland subsistence.

Both the sites of Hoxie Farm (11CK4) and Huber (11CK1), originally located in the Chicago area of Cook County, Illinois, appear to represent evidence of sedentary agricultural groups (Brown and O'Brien 1990). Both sites are located in ecotone areas bordering marshes and prairies near Lake Michigan's southern shore: Huber is on the Tolleston Ridge west of INDU, and Hoxie Farm is on a beach ridge between the Tolleston and Calumet ridges. Both exhibit numerous shallow basin-shaped features, as well as scattered ash concentrations. Both assemblages have large amounts of shell-tempered pottery sherds (Huber n=6077; Hoxie Farm n=12,000). Huber wares comprise most of each assemblage (Huber wares at Huber: 70%; Huber wares at Hoxie Farm: 96%), while Fifield wares comprise less than 5% of either assemblage.

Southern Wisconsin hosts a wide range of subsistence strategies during the last millennium, ranging from small-scale hunting and gathering to full-scale horticulture. Occupations of all groups occur in similar environmental settings well-adapted to the full range of subsistence activities. Richards and Jeske (2002) describe four ceramic wares, presumably associated with distinct cultural groups. These include Madison ware, various Late Woodland collared wares, Oneota materials, and Middle Mississippian ceramics.

The site of Aztalan, situated on the Crawfish River in Jefferson County, Wisconsin, some 50 miles inland from Lake Michigan's southwestern shore, is widely considered a rare example of Middle Mississippian presence in the Lake area (Goldstein and Freeman

1997). This site was noticed by the American press in the early-mid 19th century, with formal excavation starting in 1919 (Goldstein and Freeman 1997). Unlike the rest of the assemblages discussed here, Aztalan possesses the suite of traits distinguishing Middle Mississippian occupation: palisaded walls surrounding multiple platform mounds, plaza, and habitation areas and evidence of corn, bean, and squash agriculture. Faunal materials indicate a reliance on deer, with inclusion of a wide variety of animals in the diet as well. The artifact assemblage contains a broad array of Mississippian ceramic, ground stone, and chipped stone forms (Goldstein and Freeman 1997:235-237).

Important for this discussion, the ceramic assemblage includes both grit-tempered and shell-tempered wares. The collared (Goldstein and Freeman illustrate a castellated example [1997:234]), grit-tempered, and cord-marked ceramics are represented, as are classic Mississippian shell-tempered forms with curvilinear trailed decoration and smoothed surfaces.

Because early observations, made prior to the effects of modern tillage, indicate the presence of Mississippian architectural traits, Aztalan is recognized as a Middle Mississippian town. If not for this, the rest of the suite of traits might fit into that described for other regional Upper Mississippian/Oneota sites. Beyond the striking architecture and location in a low-lying riverine setting, differences in assemblages might just be a matter of degree.

The Summer Island Site (20DE4), located on an island in Delta County, Wisconsin, along Lake Michigan's northwestern shoreline, was first investigated by Quimby in 1959 (Binford and Quimby 1963; Brose 1970). That work incorporated surface collections from deflated areas along the dunes and subsequent projects added test pits, a profile trench, and more extensive excavations (Brose 1970:17-20). A component of the Summer Island assemblage was identified as Upper Mississippian, and was associated with hearths, refuse pits, and a storage pit. Subsistence data indicates a late summer occupation with a broad spectrum of faunal debris representing mammals, fish, birds, reptiles, and amphibians.

Sixteen vessels were represented in the ceramic assemblage including 42 rim sherds, 286 decorated body sherds, and 110 undecorated body sherds. Of this latter group, 61 sherds were grit-tempered and cord-marked, while 49 were shell-tempered and smooth. Brose notes the presence of an uncastellated, collared ware similar to some in the Aztalan and Spring Creek assemblages.

The Late Prehistoric Period at INDU

National Park Service excavations at INDU have also revealed Late Prehistoric occupation. The Midwest Archeological Center excavated at several localities along the Calumet Dune ridge in INDU's East Unit from 1988 to 1992, producing the bulk of information currently available about Late Prehistoric lifeways and occupation within the Lakeshore's modern boundaries (Lynott et al. 1993; 1998). Excavations at five sites

(12PR288, 12PR295, 12PR297, 12PR298, and 12PR299) uncovered several kinds of features including small basin-shaped pits, flat-bottomed pits, hearths, and artifact concentrations. One possible post mold excavated at 12PR288 is a rare example of potentially direct evidence for dwellings, but given the nature of the sandy sediments, the presence of plowzone at one site, and extensive tree root and rodent disturbance at others, it is quite possible that small, shallow features such as post molds may not be preserved or discovered.

Lynott et al. (1998:235, 240) illustrated a few Late Woodland-Upper Mississippian triangular projectile points recovered from the East Unit Campground area (see Figure 4). Ceramics are almost entirely grit-tempered, with collared and direct rim forms consistent with those described for other assemblages in the region (see Figure 6). A close reexamination of the INDU collections at MWAC also revealed a few small sherds with plate-like voids consistent with crushed shell temper that has since leached away. Figure 8 shows an example of this paste under magnification.

In general, work during the East Unit Campground project provided valuable information regarding prehistory and especially late precontact at INDU. Although sufficient data to determine Late Prehistoric lifeways are still lacking, it is now clear that more intensive activity did take place here than was thought previously. Further data on domestic activity and resource extraction, as well as ceramics will help to clarify understanding of the Lakeshore's prehistory.

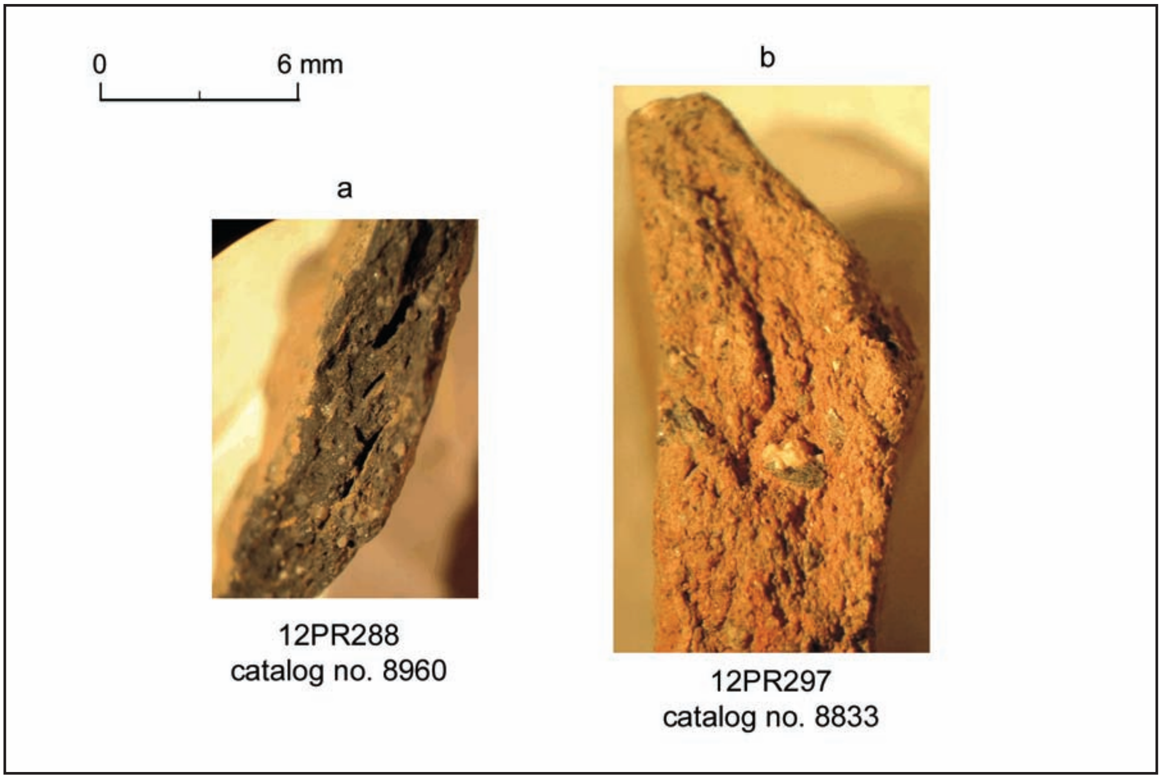

Figure 8. Examples of prehistoric ceramic pastes found at INDU. a: compact, dark gray paste with platy voids consistent with crushed shell particles. b.: lighter-colored, less dense, sand-tempered paste characteristic of the majority of pottery found at INDU.

The relatively late dates associated with Late Woodland assemblages (Lynott et al. 1998) in combination with the paucity of Upper Mississippian ceramics suggests that the Lakeshore area did indeed serve a locally unique niche, at least in Late Prehistoric and Protohistoric times. In contrast to the Chicago and Kankakee areas, for example (see Schurr 2003), it does not appear the Upper Mississippian trait complex displaced the Late Woodland. This issue is given further consideration in Chapter 5. Given this ambiguous status, in which neither cultural entity is clearly responsible for the material record, it may be best to refer to materials attributed to this period generally as "Late Prehistoric," as has been done elsewhere (e.g., Finney 2002).

Historic Era

This section represents a brief outline of historically-known developments at INDU. White (2000) gives a thorough review of French, British, and American periods of occupation and should be consulted for research on historic and ethnohistoric topics.

Colonial Expansion

The French had the earliest historic European presence in the study area, with exploration first reported from 1675 – 1679. However, the first fur trade post, also French, was not founded until the 1750s (Clemensen 1979; Trubowitz 1992). During the initial years of exploration (1634-1717), Europeans in the Great Lakes area included explorers, soldiers, priests, traders, and settlers (Walthall and Emerson 1992:8). In 1689, Jesuits established the St. Joseph Mission near present day Niles, Michigan, near the juncture of the St. Joseph -- Kankakee River portage and the Great Sauk Trail, which would develop into Fort St. Joseph, a hub of the Great Lakes fur trade from 1691-1781 (Nassaney et al. 2003). A small French-era outpost known as the Petite Fort was reputedly established in what is now Indiana Dunes State Park during the 1750s, although historical evidence for its presence is very limited and no archeological evidence has been confirmed (Brennan 1923:39, 47; Meyer 1954; Sturdevant and Bringelson n.d.).

Historic accounts of native peoples during the late 17th and early 18th centuries describe the Miami people as the primary residents of the southern Lake Michigan area including the St. Joseph River valley (Callender 1978:681; Kinietz 1965:165). During the early 1700s, many Miami groups left their traditional homeland and moved south onto the Wabash and Maumee Rivers to foster trade and political alliances with the English. By the turn of the 18th century, after several migrations along Lake Michigan, the Potawatomi are generally considered to be the principal inhabitants of the southern Lake Michigan area (Clifton 1978:726; Kinietz 1965:309; Swanton 1952:243). White (2000:66-68) reports the existence of more than 30 historically documented Potawatomi settlements around southern Lake Michigan during the late 18th and early 19th centuries. By 1820, the Potawatomi occupied the entire south shoreline of Lake Michigan as well as northern Indiana and Illinois (Clifton 1978:726).

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Though French presence in the area virtually ceased by the late 1700s, the Potawatomi continued to strengthen their connections with English colonial powers throughout much of the 18th and early 19th centuries. Relations between Europeans and native groups were primarily based on the fur trade, which the European governments used as a bargaining tool to control alliances with and between native groups (Walthall and Emerson 1992:10). Both the Potawatomi and Miami were sporadically involved in the various conflicts between French and British interests during the second half of the 18th century. Conflicts amplified with the American Revolution and the increased westward expansion of the United States, which the Potawatomi resisted. The War of 1812 found the Potawatomi fighting on the side of the English in opposition to the United States (Clifton 1978:737). White (2000) notes that the Miami left the Lakeshore area by 1720 for parts of Indiana to the south. The U.S. Government forcibly removed the Miami and the Potawatomi to reservations in Kansas and Oklahoma during the mid 19th century. While large portions of the tribes were moved to the Plains, scattered Potawatomi remain in the southern Lake Michigan area, including a small group of families living in southern Michigan on a small amount of tribal land (Edmunds 1978:274). In addition, many Miami live in cities in Indiana, including Fort Wayne, Peru, and South Bend (Rarfert 2003:287).

Early Euroamerican Settlement and Travel along the Lakeshore

Non-native exploration and use of the area appears to have maintained a consistent but non-intensive pace during the 17th and 18th centuries. American use of the Indiana Dunes area during the early 19th century followed this low-intensity pattern; early surveys and travelers' journals from the 1820s and 1830s note that Europeans had "as yet, left only a slight mark on the surroundings" (Limp 1974:11-12). Low-intensity use of the area south of Lake Michigan is largely tied to topography. The Kankakee marsh to the south of the Valparaiso Moraine and the Black Swamp to the east in Ohio, impeded traffic to the study area from those directions. In addition, the high, long dune ridges within the study area are interspersed with low-lying wetlands. The east-west running ridges comprised the only feasible inland travel routes. Early historic travel routes across the region ran exclusively in an east-west direction; the only north-south trails were merely connections between the major east-west routes (Cook and Jackson 1978; Meyer 1954; Quinn Evans 2000). The few passable routes were considered very difficult to traverse (Meyer 1954, 1956), limiting European use of the area. While industrial and residential development transformed the Chicago area to the west and Detroit and smaller communities to the east, the Indiana Dunes area remained relatively unchanged well into the 19th century.

This topography of raised beach ridges interspersed with low-lying marshes limited potential travel routes. In fact, footpaths established by indigenous groups in prehistory and early historic times transitioned naturally into routes used by Native and European Americans between trading posts (Fort Dearborn, the site of the future Chicago was established in 1803). These trails were also used by settlers moving into and through the area. These trails would later develop into roads as transportation routes became established between Detroit and Chicago (Meyer 1954; see also Figures 2 and 3).

The shore of southern Lake Michigan served as one of the easiest routes between Chicago (i.e., Fort Dearborn) and Detroit during the early 19th century. When well compacted by wave action, the beach sands served as an unobstructed and relatively easy route around the Lake. However, travel conditions varied greatly according to the weather. Time required to travel this route could vary from hours to days (Meyer 1956:319).

The Great Sauk Trail served as another passage through the region surrounding the head of Lake Michigan. Part of a trail system that traverses the United States, the Sauk runs as far west as Omaha, Nebraska, where it splits into sections of the Santa Fe and Oregon trails. The section of this trail running near the Indiana Dunes received its name from the Sauk and Fox, who traveled annually from Rock Island, Illinois, to Detroit to receive government annuity payments (Meyer 1954:257). Today this route hosts a section of US Highway 20.

The Calumet and Tolleston beach ridges also bear historic trails with continuous use into modern times. A route tracing a small bench on the north side of the Calumet Dune ridge became the first stage coach thoroughfare, and later, the path of US Highway 12.

Permanent settlement: Joseph Bailly

The first permanent settler of European descent sought to use the Indiana Dunes to his advantage. Joseph Bailly was born in Quebec in 1774 (Limp 1974; Riordan et al. 1983:7) and by the end of the 18th century, he had established a position in the fur trade supplying groups in southern Michigan. In 1822, Bailly purchased a tract of land on the south shore of Lake Michigan along the Little Calumet River near the Great Sauk Trail (Riordan et al. 1983:10). Joseph Bailly understood the importance of the multiple transport routes (Great Sauk Trail, Lake Shore Trail, and Calumet and Tolleston Trail routes, as well as the Little Calumet River and Lake Michigan). Through a series of treaties and land cessions by the Indians and the granting of money and key lands to Bailly's family that followed (Limp 1974; Quinn Evans 2000; Cook and Jackson 1978), he acquired properties near these routes. Bailly had hopes that the area around his properties would continue to grow in importance as people traveled around the southern lakeshore between Chicago (or Fort Dearborn) and Detroit (Riordan et al. 1983:10). This is evidenced by his Bailleytown, another of the region's "Dream Cities," platted in the 1830s but never realized.

Joseph and his wife Marie (a Potawatomi) homesteaded and opened a trading post at the intersection of these regional trail routes (Cook and Jackson 1978). Bailly achieved relative prominence due to his location at this crossroads. His property was also positioned within excellent fur-trading territory, between the Calumet marshes and the lakeshore, and the Kankakee marshes to the south provided habitat for a variety of fur-bearing animals. His association with the American Fur Company (Meyer 1954) cemented his financial success. Bailly later opened a tavern at this location, a move that likely supported his family after the decline of the local fur trade at around 1830.

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At the time of his death in 1834, Joseph Bailly had amassed a respectable wealth and was a year away from the completion of a new home. Bailly family descendants continuously occupied the Bailly Homestead until 1917 when granddaughter Francis Howe passed away (Riordan et al. 1983:10). Archeological studies conducted at the Bailly Homestead have demonstrated the presence of significant buried features including structural remnants from a well house, windmill, and numerous brick walkways (Limp 1974). However, the structural remnants uncovered by Limp (1974) date to the late 19th to early 20th century occupation of the Bailly homestead. Studies of the historic artifacts collected from the Bailly Homestead provide dates for materials from the middle 19th through the early 20th centuries with a few items from the early 19th century (Limp 1974:42; Riordan et al. 1983:19). The few early to mid 19th century transfer printed ceramics that have been collected indicate that the Bailly family was relatively prosperous but not overly wealthy (Riordan et al. 1983:20).

Rising Land Use: the Family Farm

In the 1830s a second wave of Euroamerican settlers moved to the region and by 1840 the population of Porter County was over 2000 (Limp 1974). Meyer (1956) documented the addition of gristmills, sawmills, taverns, and pioneer-built spurs added to traditional roadways and platted (if never realized) towns throughout the southern Lake Michigan area. During the mid 1800s farmers began installing drainage ditches that changed the landscape drastically and in 1852 the Michigan Southern and Central Railroads were completed. These developments contributed to an increasing flow of people and goods through northwest Indiana, thereby opening the region surrounding the National Lakeshore area to more use and increased settlement.

The second historically prominent family to reside along the Little Calumet drainage within INDU was the Chellberg family. In November 1869, the property which would come to be known as the Chellberg Farm was purchased by John Oberg and Anders Kjellberg (Quinn Evans 2000). In 1874, Anders and Joanna Kjellberg relocated to Porter County, having come to the United States from Goteburg, Sweden, nine years earlier (Riordan et al. 1983:12). During the 1870s the family began a modest farm, growing wheat, rye, corn, oats, and hay, later turning to the production and shipment of dairy products and maple syrup to Chicago (Riordan et al. 1983:12).

By the 1880s the farm had enlarged significantly and included 40 tilled acres and 20 acres for pasture land, orchards, and vineyards (Quinn Evans 2000:24). In 1884, the original wood frame house burned down and was replaced by a brick structure the following year. After the 1893 death of Anders Kjellberg, his son Charles Chellberg became the controlling shareholder on the farm by buying out the other inherited shares from his mother and sister (Quinn Evans 2000:29).

During the early part of the 20th century Charles Chellberg continued to transform the farming operation and by 1908 had established a dairy herd of approximately 12-14 cattle (Quinn Evans 2000:31-32). In 1901, Minnie Chellberg oversaw renovations to the house, which included the installation of a kitchen, summer kitchen, and porch (Quinn Evans 2000:33). Throughout the 20th century the family continued to modernize the farmhouse and also added several smaller buildings to the property including a tenant house, silo, corn crib, sheep shed, and sugar camp. The family resided at and operated the farm until descendant Carl Chellberg moved away in 1972. The property was then purchased by the U.S. Department of the Interior, National Park Service and incorporated into Indiana Dunes National Lakeshore.

A total of eight farm-related structures are currently being maintained by the National Park Service (Sturdevant 2004d). Several small-scale archeological inventories have been conducted at Chellberg farm. Although somewhat limited, the data generated by these works (Clark 1991; Ehn 1987; Stadler 2000, 2002b; Sturdevant 2004d) have helped make it one of the better known historic sites in the park.

Industrial Transformation

By the 1880s, the southern Lake Michigan area had been integrated into the larger national economy by the building of railroads and interactions with Chicago and other large urban centers (Riordan et al. 1983:19). While industrial and residential development transformed the Chicago area to the west and various communities (including Detroit) to the east, the Indiana Dunes area remained relatively unchanged well into the 19th century.

The 20th century, however, saw vast changes to the landscape of the Dunes region. As outlined in Chapter 2, development in Chicago and other budding metropolises during the latter years of the 19th century created markets for the sand composing the landscape itself. In addition, the combination of available land, proximity to unlimited amounts of clean, soft water, and easy access to major transportation routes (water, rail, and roads) made the Dunes area very attractive to the oil and steel industries (Cockrell 1988; Engel 1983; Franklin and Schaeffer 1983). Large-scale modifications to the Dunes landscape related to the development of these industries began in the late 19th century with plants built by the Standard Oil and U.S. Steel companies and continued into the mid-20th century with actions of the Northern Indiana Public Service Company (NIPSCO), Bethlehem Steel, and Midwest Steel (Engel 1983; Franklin and Schaeffer 1983). These modifications effectively mirrored the sand mining that had started decades before, removing large sections of dune formations as a means of creating space for sprawling operations, sometimes using sediments as fill to extend useable land into Lake Michigan (Franklin and Schaeffer 1983:99). One spectacular change was the removal of 2.5 million cubic yards of sand by the Bethlehem Steel Corporation for the creation of a public port and harbor necessary for their operations. The sand was sold to Northwestern University, which used it as landfill for a campus expansion (Franklin and Schaeffer 1983:114). This action, in 1962, culminated from a decades-long battle that had persisted between the Save the Dunes Council and Senator Paul Douglas and political and industrial interests for control of the Dunes area. It was a significant setback for environmental and National Park interests.

Twentieth Century Land Use

By the turn of the 20th century, the unique setting and resources of the dunes had attracted the attention of academics, conservationists, tourists, and industrialists. Proximity to Chicago, combined with the striking topography and relative solitude, drew many weekend tourists and resort occupants to the dunes and beaches along the shoreline (Engel 1983). Throughout the early part of the 20th century, people would travel to the Indiana Dunes area as a contrast to their urban settings and began supporting its preservation for continued future recreational use and enjoyment (Engel 1983; Franklin and Shafer 1983). In addition, pioneering work in the study of ecology was performed using the temporally distinctive sets of dunes as a living laboratory. Henry Cowles and his students contributed a great degree to the understanding of plant communities and the concept of biological succession (Engel 1983; Waldron 1998).

This conservation movement, tied to tourism and academia, conflicted with industrial interests. Portions of the National Lakeshore sand dunes have been extensively mined for fill during development of Chicago and other Lake Michigan communities and frontage around the southern tip of Lake Michigan is valuable for industrial transportation. After decades of conflict and compromise, the Indiana Dunes National Lakeshore was created and in 1969 the National Park Service held its first summer visitor season (Cockrell 1988).

4. HISTORY OF ARCHEOLOGICAL RESEARCH

History of Archeology in Northwest Indiana

As is the case in many areas across the globe, the archeological record of Northwest Indiana has suffered from the impacts of industrial development, agriculture, and indiscriminant collection through time, especially over the past century. As outlined in the previous two chapters, this area around southern Lake Michigan and adjacent to the Chicago metropolitan area has been notably impacted. While archeological investigation has not been the primary focus of most of the scientific inquiry (cultural resources have been largely overshadowed by the area's more prominent biotic assemblage), significant data collection and research have been accomplished in northwestern Indiana. Reviewing the extent and contribution of this work is important, especially as much of it pertains to cultural resources that are no longer extant.

The work reviewed here is grouped by the context within which it was done. Sections summarize contributions of avocational research, synthetic reviews, and culture historical studies and associated research. Avocational workers have contributed to current understanding of culture history and land use in Northwestern Indiana, especially in cases where provenience information is maintained with collected artifacts. Several authors have contributed to regional understanding in the action of synthesizing disparate and collective knowledge about the distribution of landscape features and the character of the archeological record, especially prior to widespread impact to the landscape by development and agriculture. By committing this knowledge to print, these authors have preserved information for the benefit of future research. These efforts are separated from those which strove to build culture history, or structure the record by time and space, thus constructing a base from which later research could work. Subsequent workers rely on culture historical units, refining them and increasing our understanding of lifeways of and relations among the people represented by those units.

The main section of this chapter focuses on archeological work performed within the boundaries of Indiana Dunes National Lakeshore (INDU). This section takes a different tack, relying on tabular format to present comprehensive and exhaustive information on assemblage-generating work conducted within the Lakeshore. Unlike that outlined for the Northwest Indiana region in general, most of the work performed at INDU has been driven by legislative compliance needs; however, significant differences pertain in type of work performed. Therefore, data are presented according to type of work, and key examples of each type are discussed in the text. Finally, all information presented is taken into account to develop an assessment of existing collections and research.

Avocational Research and Collections

Private collections make up a large portion of early archeological data relating to northwest Indiana, mainly gathered in the early-mid 20th century, if not before. The collections discussed here were amassed by residents of the southern Lake Michigan region – if not the INDU area specifically – prior to much of the large-scale regional development that so transformed the landscape and obliterated other traces of the archeological record. As discussed below, some of these materials are now part of state or federal collections, but the current whereabouts of many are unknown. In addition, the people that gathered these items are no longer available for direct interview, making any available documents discussed below especially important for future research using these collections.

C.R.N. Bergendahl

One early collection of particular note in this area is that of C.R.N. Bergendahl. This collection stands out among others made in the same era due to the high level of detail in record-keeping. Bergendahl's intentional efforts to document locations of collection for his assemblages created valuable records (consisting of sketch maps, verbal location descriptions, and Rand McNally maps all keyed to individual assemblages), which have been transmitted to archeologists at Indiana Department of Historic Preservation and Archeology and the Midwest Archeological Center.

These unique data offer an opportunity to evaluate current conceptions of land use. While the content of the collection does not contradict the assumption that few people used the shoreline intensively until late in prehistory, the presence of some Late Paleoindian and Archaic materials near the lake provides a basis for further questions and examination.

Bergendahl's contribution to the archeology of northwest Indiana, especially in and around Indiana Dunes, is significant and even more so for portions of this area which have been drastically changed due to industrial, civic, and residential development. No longer are many such assemblages available in context and Bergendahl's efforts to record artifact provenience are admirable.

While Bergendahl's notes and a record of his collection are documented in the INDU Photography Project (discussed below), the current status of his entire collection is not known at this time. Dunes State Park holds a large amount of the artifacts he collected, but the Indiana University Northwest Calumet Regional Archives have over two linear feet of material in a collection entitled "Norman Bergendahl Papers." The inventory of this holding shows it is largely comprised of images and notes pertaining to natural resources, but it also includes some artifacts (Calumet Regional Archives 2005).

Overall, Bergendahl's artifact collection holds enormous potential research value, but this value is relatively tenuous. The Dunes State Park materials are grouped in drawers by provenience, and available for research. However, the curatorial conditions there are not considered stable for long-term storage. In order to ensure the maintenance of the valuable contextual information into the future, repackaging of artifacts and attaching of provenience information is necessary. Providing the artifacts with stable microenvironments and individual labels could prevent the eventual loss of key information and research value.

Ethel Martinson Collection

Another privately generated collection that is of particular use to understanding prehistory of certain areas of northwest Indiana is that of Ethel Martinson. This collection was made during the 1920s by members of the Martinson family on their property near the Calumet River, now part of the Indian Boundary Prairie unit of INDU (Lynott 1997; Partsch 1997). Ms. Martinson showed an INDU representative two approximate locations from which some of the 28 prehistoric points were found. Many of these points are identified as Early through Late Archaic (Lynott 1997). This collection augments the INDU archeological record, which until recently contained few materials known to precede the Woodland Tradition. In addition, the collection area is adjacent to a site previously interpreted as Middle Woodland (12PR109; Honerkamp 1968), making the Martinson contribution especially significant to park, if not regional, archeological interpretation. Ethel Martinson donated the collection to INDU for the purpose of education and interpretation in 1997. The collection, sketch map, and associated memos are currently curated at INDU under Accession Number 398.

Ernest W. Young

The artifact collection of South Bend architect Ernest Young is the cumulation of work at the Goodall site, located in the Kankakee valley of southern LaPorte county (approximately 50 miles from INDU), between 1938 and 1958 (Mangold 1998). Young's collection is larger than others from Goodall and was collected prior to the full impact of modern farming equipment and techniques. In addition, Mr. Young kept notes on artifact location, including sketch maps, and collected a range of artifacts. He was apparently interested in the record of the site for questions it could be used to address, as opposed to the artifacts as objects of interest. These facts render the data especially useful for answering interpretive questions about Goodall. Mangold (1998) used this collection in an analysis of Goodall, which also included data collected by the University of Notre Dame and himself. Young's data contributed to his conclusions about the site concerning use span and function, area exchange, and function in a larger distribution system. This collection is a valuable resource, and has been known as such for decades. The Illinois State Museum accepted the collection from Young's widow in 1964 (Mangold 1998), the same year that James Brown (1964) published an analysis of the Havana Hopewell using ceramic data from the collection.

INDU Archeological Photography Project

Other private collections from the Indiana Dunes area are most valuable as a group. A cooperative agreement between a local archeological interest group known as the Northwest Indiana Archeological Association and Indiana Dunes National Lakeshore in 1978 allowed for the compilation of information on artifacts in private collections from the Dunes area, including photographs, verbal descriptions and evaluation by archeologists, and some audiotaped collector interviews. The product of these efforts, termed the INDU

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Archeological Photography Project, consists of five 3-ring binders containing 18 volumes, or collection documents. This set includes information on 17 private collections, made between 1911 and the late 1960s. The document includes description or photographs of over 8500 artifacts. Table 3 provides information on individual collections, including approximate number of artifacts documented, location information provided, time periods represented, and interpretive significance for each.

This effort provided a very significant resource for archeological interpretation of the lakeshore. The identification of Late Paleoindian, as well as Upper Mississippian, materials from the area now forming the Lakeshore potentially contributes significantly to the culture history of this area. In addition, various specific culture-historic and landscape-based questions may be addressed. Although many of the collections represented in this document were made without special care for documentation and provenience and questions which may be addressed are thus limited, the act of compiling and documenting this body of material in conjunction with collector interviews shows remarkable foresight and concern for the known record. Because of this, these collections can maintain their worth even after individuals responsible for their generation are no longer available.

Overall, the efforts of private collectors have created products of some value to understanding archeology in the region insofar as these collections are known to archeologists and in proportion to the efforts on the part of collectors to document their efforts. Just as in professional endeavors, thought given to future utility of collections for research interests results in increased care in record-keeping during avocational efforts. Early avocational collections may provide the only information available on the prehistory of areas whose sediments have since been removed or extensively disturbed. Unfortunately, collections without location information are of more limited value and if collection continues today in this fashion, it is to the detriment rather than the advancement of archeology. In addition, federal and state laws make many such activities illegal on public land (Archeological Resources Protection Act of 1979 [16 U.S.C. 470aa-470mm; Public Law 96-95 and amendments to it]; Indiana Historic Preservation Act [IC 12-21-1]).

The INDU Archeological Photography Project has potential to crystallize localized, private knowledge into a synthetic public document. This end would be greatly advanced by a concerted effort to compile the individual files into a comprehensive summary document. As it is, it bridges avocational efforts with scientific concerns, making disjointed sets of information available to researchers in one place. This document resides at INDU, with copies provided to the Midwest Archeological Center (Lincoln) and the Indiana Historic Preservation Office (Indianapolis).

Regional Archeological Syntheses

McAllister 1932

Observations regarding the utility and impacts of non-professional activity to archeology are not novel. Many early 20th century archeologists understood the importance of documenting and preserving scattered local knowledge about the archeological record; J. Gilbert McAllister was one of these individuals. Though he served most of his career as faculty in the Anthropology program at the University of Texas-Austin, McAllister made a significant contribution to the archeology of northwest Indiana while in the University of Chicago's Anthropology graduate program (Davis and Bramblett 1995). A graduate student from 1928 to 1935, McAllister served during the summer of 1931 as Acting State Director of Archeology for Indiana (Davis and Bramblett 1995) and participated in a systematic and comprehensive archeological survey of Porter County, publishing The Archeology of Porter County in 1932 (McAllister 1932).

McAllister relied on direct observation of the record as well as ethnohistorical and historical data in order to document locations of over 30 mound, village, camp, and burial sites. He also conducted and documented excavation of two of the mounds. From the perspective of this overview, however, the most valuable information he provided involves the distribution of archeological features throughout the Indiana Dunes region. Agricultural machinery post-dating McAllister's work in the 1930s has had a significant effect on the preservation of the archeological landscape. Many of the mounds he reported are no longer visible and his document is an excellent base for comparison and location of archeological sites. McAllister's work stands out as the sole professional, comprehensive work conducted in the immediate region of INDU until the involvement of the federal government in the late 1960s, preceding the formation of the park as an NPS entity.

McAllister noted several locations within the current park boundaries of archeological significance on his "Porter County Archaeological Map" (McAllister 1932:6, 11-13), labeled by number. The first of these locations (number 1) is recorded as a blow-out from which skeletal material had been found, "including a vertebra with an arrow embedded in the bone" (1932:11). This was noted just outside the western border of Dunes State Park, an area within the modern boundaries of INDU. McAllister also recorded a camp site (number 2) on the upland rises east of Tremont near the "Dunes Highway," which had yielded chipped stone and fire-cracked rock to casual collectors. This location and description match those for site 12PR111 (Frost 2001).

McAllister's third recorded site in Porter County is termed "Mound Valley" (1932:11-12). He cites Brennan's account in The Wonders of the Dunes, which describes it as "an extensive group of mounds close to Tremont Station on the South Shore Electric…" (Brennan 1923:8). Brennan cited local informants from the turn of the 20th century, saying that this area had at one time "nearly one hundred mounds [ranging] from twenty to fifty feet across and…from six to ten feet high" (Brennan 1923:9). One landowner interviewed by

Brennan described excavating one of these mounds, finding a skeleton (which disintegrated) and a "number of stone arrowheads, knives, hammers, and pieces of pottery," as well as "the remains of a long steel knife," suggesting a Protohistoric authorship and/or use of the mounds or an historic intrusion into a mound. Neither Brennan, nor McAllister after him, were able to confirm the location of these mounds, as they had been "leveled by the plow …and the contents scattered" (Brennan 1923:9).

McAllister's Site 4, described as a purported "burial ground," is likely located just within the park boundary north of Porter, on ridges on either side of the Calumet River. Although McAllister could not find evidence of occupation in this locale, Frost (2001) documented a number of "unidentified prehistoric" (ie., lithic debris and other temporally non-diagnostic materials) sites here (12PR420, 12PR421, 12PR423-427).

McAllister's care in relocating when possible (and documenting local lore when not) Native American cultural features in and around INDU in the early to mid-20th century presents a valuable resource. That certain of these sites correspond with independently identified resources underlines McAllister's systematic and intensive efforts.

Lilly 1937

Eli Lilly, grandson of the founder of the Lilly pharmaceutical company and then-president of the Indiana Historical Society, published Prehistoric Antiquities of Indiana in 1937, providing an excellent example of the contribution potential of avocational archeologists. Lilly gave indispensible intellectual and financial support to the advancement of understanding of Indiana's prehistoric record throughout the mid-20th century (Madison 1987). Economic foundations established by Lilly continue to support archeological endeavors today, as exemplified by the Glenn Black Laboratory of Archeology on the Indiana University campus. Lilly was instrumental in the planning and construction of this facility in 1971 and it operates today largely thanks to him (Glenn A. Black Laboratory 2006). Lilly's 1937 publication represents his attempt to synthesize then-current knowledge about the archeological record of Indiana for a lay audience, providing an excellent example of connecting avocational and lay communities with the professional archeological community. Information for this publication was drawn from field trips, conversations with colleagues, and extensive reading on prehistory (Madison 1987).

As McAllister did for Porter County, Lilly (1937:86) documented sites and local reports of sites throughout Indiana, which even by the turn of the 20th century were drastically altered by cultivation and indiscriminant digging. He included artifact photographs, but of special importance now are the maps and photographs he published of various mound groups throughout the state. His book also provides a summary and bibliography which is invaluable in tracing the earliest accounts and avocational investigations of (especially) mound sites in areas adjacent to INDU. Reports published in the late 19th and early 20th centuries, like Lilly's book, often document specific earthwork morphology available today perhaps only through analyses and interpretation of remote sensing data.

Black n.d.

Glenn Black also generated an archeological synthesis in Indiana as Director of Archeology at Indiana University (N. Justice, personal communication 2002). Black, born in Indianapolis in 1900, spent his career (spanning early 1930s to his death in 1964) as virtually the only professional devoted solely to the investigation of archeology in Indiana (Kellar 1966). His early and sustained professional association with Lilly and others with interests in Indiana archeology fostered a sustained interest in understanding the archeological record of the state. He spent much time traveling the state and documenting archeological manifestations and his notes on sites across the state during that period are invaluable for details no longer available. Black's notes are (unpublished) in manuscript format, with relevant sections filed by county at the Glenn Black Laboratory. Sections on Lake, Porter, and LaPorte Counties likely hold information of relevance to INDU.

While his notes represent a unique resource on a statewide scale for Indiana, Black also contributed indirectly to the synthesis and documentation of archeological information. He encouraged formalized reporting of local knowledge about the archeological record of Indiana. For example, he prompted Hiestand (1951) to author a synthesis of Newton county (directly south of Lake county), based on that author's personal collections and knowledge of the record.

Building Culture History

Black and Lilly were among the first to endeavor to construct timelines for the archeological record. Lilly is known to have assembled a research team with just such a goal in mind (Madison 1987). Research advanced toward this goal as other archeologists turned to the Indiana record to develop descriptive units for the construction of culture history and effective measurement of time. Two influential examples are discussed here, although the substance of their contributions is reflected in Chapter 3 (Culture History).

George Quimby's (1941) study of Hopewellian components in northwestern Indiana and southeastern Michigan laid the foundation for intraregional comparison and interpretation of assemblages. Quimby was born in 1913 in Grand Rapids, Michigan, spent part of his childhood combing the dunes on the east shores of Lake Michigan, and developed an early interest in ethnology and the study of trade in Indian society (Quimby 1993:8). He earned his undergraduate degree in 1936 from the University of Michigan-Ann Arbor, and received his master's degree in 1937 from the same institution. During the summer of 1937, Quimby (working for the UM Museum of Anthropology) collaborated with Glenn Black (working for the Indiana Historical Society) on a survey of the St. Joseph River valley of southwestern Michigan (Quimby 1993).

The Goodall Focus (Quimby 1941) represents a synthesis of work Quimby started in collaboration with James B. Griffin at the University of Michigan in 1935, as well as with Black (Quimby 1941:63). In it, he constructed a pottery classification incorporating ten assemblages, as well as trait lists describing other aspects of Hopewell archeology in this area. He concluded that the region's Middle Woodland manifestation (i.e., Goodall Focus) represented a migration of Hopewellian groups into the Kankakee valley from Illinois (i.e., Havana Hopewell).

Quimby's work has served as a base against which subsequent workers tested ideas regarding land use in Middle Woodland times. James Brown (1964), for example, challenged his predecessor's interpretation of the record. Brown supported environmental factors, not culture contact, as explanation for the distribution of Goodall components, noting that all are associated with environments such as those associated with the Kankakee swamps. While Brown disagreed with Quimby in his interpretation of Middle Woodland components in the study area, it is important to note the pivotal influence of Quimby's early culture historical work. Without this foundation, interpretation of archeology in and around INDU could not progress to address environmental and functional questions.

Charles Faulkner's (1970, 1972) work on Upper Mississippi components in northwestern Indiana, while conducted decades after Quimby's work with Hopewell materials, functioned very similarly for regional archeologists investigating later prehistory. Faulkner completed his doctoral thesis in 1970 at Indiana University, focusing on a topic first suggested and encouraged by the then-late Glenn Black (Faulkner 1970:ii). He focused his study on the Upper Mississippian manifestations along the Kankakee and Illinois Rivers, tributaries of the Mississippi in northeast Illinois and northwest Indiana. He noted that the dunes south of Lake Michigan did not appear to have hosted heavy occupation during late prehistory, but the Kankakee marsh area did. He attributed this to the diversity of "natural communities" represented along the Kankakee, including dry prairie, marshland, and forested uplands (Faulkner 1970:2). Faulkner's analyses created ceramic and other material culture groupings used by subsequent workers for comparison and culture historical interpretation (e.g., Mason 1981; Schurr 2003), which have played a prominent role in interpretation of Late Prehistoric materials at INDU.

Work within the Lakeshore Boundaries

Frost (2001) provides an excellent summary of work conducted within the boundaries of Indiana Dunes National Lakeshore, including a review of the results of all projects since INDU was formed as well as earlier work (e.g, Thomas 1894, McAllister 1932). Although all work at the Lakeshore since 1966 was performed under federal mandate, the projects accomplished are not equivalent in terms of goals, methodologies, and resulting utility for research purposes. Types of work at INDU include incidental discovery, monitoring, reconnaissance, inventory, testing, and mitigation. The first archeological investigation conducted after the park's authorization occurred in 1968 (Honerkamp 1968). Definitions and examples of each project type are given below, with a full listing presented in Table 4.

Incidental Discovery

Although these activities are not systematically planned and conducted projects and are not necessarily related to compliance activities, they are represented in artifact and archive collections and are addressed here. Incidental discovery is defined here as any activity that causes the notice and collection of one or more artifacts and results in the incidental addition of new artifacts to public collections. Most incidental discoveries listed in Table 4 resulted from observations by park personnel along trails (e.g., Ehn 1989, 2001) or from park visitor reports (e.g, Ehn 2002; Frost 1997). The Martinson collection, discussed above, presents a notable exception to this generalization. This set of artifacts is designated as an incidental discovery, as its inclusion in the Lakeshore's artifact collection was not planned by cultural resource managers. However, it represents relatively intensive collection of a specific area within the Indian Boundary Prairie near the Bailly Homestead by previous landowners before establishment of the park.

As artifacts from incidental discoveries are typically collected in a non-systematic way, interpretive results are often nominal. However, we know incrementally more about prehistoric culture history at the Lakeshore as a result of incidental discoveries. Certain diagnostic materials added to collections in this manner represent unique or important examples of their class (e.g. Ehn 1989, 2001; Lynott 1997; Partsch 1988) and expand our understanding of the span and kind of occupation in this area. Certain pointed bifaces in the Martinson collection, for example, are consistent with Archaic period occupation. The area in which the Martinson collection originates had previously been reported to contain a Woodland Tradition site; the addition of this collection extends the known record of occupation there thousands of years (Lynott 1997).

Monitoring

This type of project is defined as the observation and recording, by an archeologist, of ground-disturbing activities that are undertaken for non-archeological purposes. Monitoring is often employed in cases where information derived from other archeological activity indicates that the probability for sub-surface cultural deposits is low, or where the scale of the project is extremely small (e.g., posthole digging, minor trenching), to insure that unpredicted subsurface resources are documented if inadvertently encountered. Table 4 lists accessions resulting from monitoring projects. The majority of monitoring work does not result in collections other than archives (records, notes, maps, etc.), as no cultural deposits are encountered. Notable projects that did produce small numbers of artifacts were byproducts of small-scale renovations to the Bailly and Chellberg houses, where artifact deposits were not unexpected (Ehn 1987; Lynott 1985; Schurr 1997).

While they have added to knowledge about archeological deposits at developed historic sites, monitoring activities account for little of what is currently known about prehistoric and early historic human occupation of the Lakeshore. This is due to two related reasons. Resource management procedures are designed to minimize the need for monitoring – ideally, ground disturbance is planned in such a way that archeological materials are not expected to be encountered during monitoring. Secondly, the scope of individual monitoring projects is limited and thus provides little information overall. This type of activity appropriately serves as a precaution against unexpected site disturbance or destruction without some form of resource documentation.

Reconnaissance

Several early projects at the Lakeshore had a basic goal to determine if archeological resources were present on the property. Honerkamp (1968) and Johnson (1974, 1974b) exemplify this; both documents report on investigations conducted in the process of establishing INDU. Their goals were to evaluate the potential importance of archeological resources in the new park units, relying on obvious surface archeological remains, reported sites, and historic resources to make assessments. Honerkamp (1968) and Johnson (1974a, 1974b) represent starting points in the cultural resource management process at INDU. As a result, absence of positive results in the areas investigated by these projects should not be interpreted as indication of absence of archeological resources. The purpose of this kind of work is exploratory, rather than definitive.

Inventory

The majority of the archeological projects undertaken at INDU have also aimed at identifying resources, but differ from reconnaissance in the methods employed. Projects classified as inventory use systematic, intensive investigation of well-defined areas, although more recent inventory work differs further. Investigations undertaken as part of the Reservation of Use and Occupancy (ROU) program differ in their methodology from those funded by the Systemwide Archeology Inventory Program (SAIP).

ROU Program

The ROU program was instituted at INDU as part of the long-term efforts to return the Lakeshore to a state characteristic of the area prior to intensive residential development. This National Park Service program allows the NPS to buy land occupied by private land owners at the time a park is being formed. The private land owner(s) are fully compensated for their property, which becomes part of the NPS unit, owned and operated by the park. However, the residents retain certain rights of use and occupancy for a specified period of time. After this time expires, full control of the land is transferred to the NPS and the land is treated according to the overall management plan for that particular park.

After properties are vacated, INDU proceeds with restoration of the site to its pre-developed state, such as the removal of houses and other recent structures and restoration of the topography and vegetation. As this may impact existing cultural resources, the ROU process requires cultural resource management input, including collection of architectural, historic, and archeological information. Archeological investigation of ROU tracts entails examination of all visible surfaces and interval shovel testing of all intact landforms likely to be disturbed during structural removal or modification, as well as areas between the structures, driveways, and outlets to in-use roadways.

ROU-driven inventories have been conducted at INDU since 1992 and have led to the discovery of significant archeological deposits. One of the few Early Archaic sites (12PR597) known within the Lakeshore's boundaries was located within an ROU tract (Stadler 2001b). However, it should be noted that the initial inventory data only revealed evidence of prehistoric occupation; the projectile points diagnostic of the Archaic period were not found until a more intensive, subsequent investigation of the tract (i.e., testing, as discussed below) occurred. Overall, the ROU program fits well within a nested management strategy, in which initial inventory is performed as a means of determining the potential need for more intensive work. ROU investigations provide information necessary for effective decision-making regarding cultural resource management and further research. However, information gleaned solely from this line of investigation is not sufficient to provide a full and accurate picture of archeology at INDU.

Being compliance-driven, this process is also aimed at detection of existing surface and near-surface archeological resources that would likely be impacted during the process of structure removal and lot rehabilitation. Therefore, archeological findings apply only to ROU tracts and just those portions of these tracts in close proximity to the structures and related areas investigated. Additional research conducted in other areas of these tracts can present further information about the archeological record at INDU and gradually and cumulatively augment the park's archeological baseline information.

SAIP Investigations

Inventory projects pursued as part of the Systemwide Archeological Inventory Program, or SAIP, follow a different methodology. These projects are aimed at systematically increasing baseline knowledge of archeological resources at INDU and other parks. SAIP inventories were conducted at INDU over a four-year period and the results of the entire effort are detailed in Forest Frost's 2001 report, "Archeological Inventory and Evaluation of Selected Areas, Indiana Dunes National Lakeshore, Indiana: 1992-1995." The field methods relied on shovel tests, initially spaced at maximum intervals of 15 meters in 1992, but on 10-meter intervals in subsequent years. Higher intensity shovel testing (five-meter intervals) was used to investigate areas immediately surrounding shovel tests in which artifacts were found (Lynott and Frost 1997:39-41). This was done to determine whether the artifact(s) in the positive test was part of a larger concentration, and if so, to determine the extent of that concentration.

Frost identified 177 archeological sites during the course of fieldwork, the vast majority of which were prehistoric lithic scatters without obvious evidence of features or diagnostic artifacts (many of these sites probably contain diagnostic artifacts, but work was conducted at too limited a scale to reveal them). He concluded that the INDU area served in prehistory as a locus of seasonal, temporary occupation, likely for purposes of exploiting the diversity of food resources in the area. He also determined that, even though much of the duneland food resources were likely found in the low-lying wetlands, occupations tended to cluster on the dune ridges adjacent to lower areas. This inventory project produced a valuable set of information from which to evaluate earlier interpretations regarding land use around the lakeshore (e.g., Faulkner 1972). It also presents a set of questions for future research, regarding timing or seasonality of occupation, group size, and community patterning through the Holocene.

The 1992-1995 SAIP project sampled about five percent of the total area within the Lakeshore boundaries (including wetlands, although these were inaccessible to shovel-testing). The systematic way in which the sample was inventoried allowed Frost to make statistical statements regarding site size and density across landforms, though the survey methods were sufficient neither to detect all possible archeological resources within the study area (a virtually impossible task), nor to reveal the specific nature of cultural deposits that were detected. As with ROU investigations, SAIP-driven inventory fits well within a nested approach to management and investigation, providing preliminary data over an extensive area, which are useful for limited interpretation and for the design of further, more intensive investigations in specific locations as deemed necessary (see below). Accessions and projects related to SAIP are listed in Table 4.

Testing

Testing is defined as examination of sites that have previously been identified for the purpose of evaluating the extent and density of artifacts, integrity of archeological deposits, and representation in the assemblage of time periods and/or cultural manifestations. This kind of investigation is used to evaluate resources for eligibility for inclusion in the National Register of Historic Places and often provides greater detail on period(s) of occupation and activities likely represented at a given archeological site.

Archeological testing is distinguished from reconnaissance or inventory by the use of controlled volume excavation units (“test units”), usually 1-meter x 1-meter in size or larger. These are noted in project descriptions (see Table 4) and signify the greater intensity of investigation aimed at evaluation of archeological resources. Information generated by such projects is used to estimate vertical extent, density, and integrity of cultural deposits and to inform management decisions.

Testing at INDU has also contributed dramatically to cultural chronology for the park. Lithic scatters, typically temporally and functionally non-diagnostic on the basis of limited investigation, are ubiquitous in the known record at INDU. Such deposits often yield much more information when exposed to higher intensity investigation. Stadler’s (2001b) work at an ROU tract revealed relatively rare Early Archaic materials during a testing phase at 12PR597 and his testing at 12PR608 (Stadler 2002a) provided information on Late

Archaic and Early Historic occupations. Both sites were recorded as non-diagnostic lithic scatters after preliminary inventory efforts.

Investigations performed at the East Unit Campground also demonstrate the contribution of testing projects to better understanding the INDU record. Inventory procedures undertaken during the planning stages of campground construction covered a 182-acre parcel of land (Lynott et al. 1998:224), including examination of bare ground (e.g., blowouts and roadcuts) and systematic shovel testing of vegetated areas, resulting in the recording of 15 sites. While these methods succeeded in detecting the presence of sites, more information was required. Testing phase investigations were conducted “to collect information about the age of the sites, contextual integrity of the deposits, and the types of artifacts and ecofacts which might be preserved” (Lynott et al. 1998:226). Archeologists excavated 54 test units across 11 sites in the East Unit Campground area, concluding that relative density of cultural materials in this area is low. Test unit excavations also provided information about the nature of archeological sediments in the Calumet Dune Ridge. Artifacts often appeared further below surface than predicted from inventory data – down to 50 or 60 cmbs. The extent to which vertical provenience of archeological deposits reflects temporal relations is unclear. Lithic and ceramic materials lacked evidence for mechanical abrasion, so researchers ruled out significant disruption by aeolian activity. However, they were unable to discount rodent activity as a potential source of artifact movement (Lynott et al. 1998:254).

Based on test excavations, archeologists determined that five of the tested sites had potential to provide significant information about prehistoric activity at the Lakeshore and planned data collection excavations to mitigate the impacts anticipated to result from campground construction and use.

Another notable example of archeological testing undertaken at INDU is an intensive set of shallow backhoe and hand excavations performed at the Bailly Homestead (Limp 1974). A series of eight to ten-inch deep backhoe trenches were placed around the structures at Bailly on approximately 15-foot intervals in an effort to discern the chronology of historic architecture at the site. Nearly 150 square feet of hand excavation supplemented this and provided a means of interpreting historic occupation at this location. This project provided the baseline for archeological interpretation of the historic occupation at this locale. Various smaller projects relevant to the homestead and cemetery are referenced in Tables 4 and 5.

Overall, testing has provided the majority of temporal and functional information we have for occupation at INDU. This level of examination has refined and even proved inaccurate several conclusions built upon less-intense work, especially in regard to prehistoric archeology. In addition, results of this activity have revealed new data on archeological deposits at the Lakeshore and underlines the potential of deposits not yet tested. Projects involving testing are listed in Table 4.

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Mitigation of Impacts

The ultimate goal of archeology in the realm of cultural resource management is the identification of significant resources so that park managers may plan construction and other earth-moving activities in ways that minimize or avoid adverse impacts to them. Planning for avoidance is a form of impact mitigation. However, avoidance of impact is not always a viable alternative. Significant archeological resources that would be unavoidably impacted by development require comprehensive data collection beforehand. Mitigative investigation projects aim to gather as much data from a site as possible before it is damaged or destroyed by other activities. These archeological projects are characterized by extensive excavation and analysis and provide a basis for interpretation of land-use, culture history, and other research questions. They may also provide excellent opportunities for collections-based research.

Only one project exemplifies this level of fieldwork at INDU: the final phase of investigations at the East Unit Campground (Lynott et al. 1998). Archeologists conducted extensive data collection at 12PR288 and 12PR295 in 1990, and at 12PR297, 12PR298, and 12PR299 in 1992, with the goal of "recovering a large sample of material culture, and exposing features that might contain subsistence data or materials suitable for radiometric dating" (Lynott et al. 1998:228). Archeologists excavated series of contiguous units at each of these sites and while they found no evidence of living floors or buried soil horizons, they did locate several pit and hearth features, some of which yielded charred macrobotanical and faunal remains. Materials collected also included ceramic sherds and projectile points, as well as fire-cracked rock and lithic reduction debris.

In addition, researchers were able to evaluate the context of deposits and collect samples for radiocarbon dating. The twelve dates derived from this project indicate occupation starting about 2200 years ago, extending to approximately 500 years ago (see Lynott and Frost 1997: Table 6; Lynott et al. 1998: 254), or a mix representing Middle Woodland and Late Woodland/Late Prehistoric contexts. These dates, derived independently of artifact analyses, are unique at INDU and allowed researchers to refine ideas about the temporal depth of occupation of the Lakeshore's land. They found that depth below surface, artifact type, and radiocarbon dates all correlated and used this to reinforce the notion that the depositional context of cultural deposits in the Calumet Dune ridge is intact.

Lynott and colleagues (1998) also gathered information on mineral constituents of ceramics in order to test hypotheses about sources of raw materials for pottery found at INDU. Results of neutron activation analysis (NAA) suggest that at least some of the ceramics at INDU were produced locally. Prior analyses (Neff et al.1994) of INDU ceramics and clays suggested sources five to eight miles inland from the lake's shoreline. While the earlier study suggested that ceramics were largely manufactured away from the immediate Lakeshore vicinity, strengthening interpretations for seasonal movement of people between the Lakeshore and other regions such as the Kankakee valley to the south (cf. Faulkner 1970, 1972), the combined data set supports both immediately local and non-local sources of clay.

The benefits of a project of this scope and detail in any place are significant and even more so at a place like INDU where relatively little is known about how people used the landscape through the Holocene. Results of the mitigation project at the East Unit Campground presented the possibility that this area has been used in the prehistoric past in more substantive ways than had been previously assumed.

INDU Work to Date

It is clear from this outline of work in the Lakeshore that the intensity of investigation is directly related to the nature of the record revealed. Reconnaissance level projects created the impression that the prehistoric record at INDU reflected only sparse use and had little substantive information to offer on past occupation and activity. Inventory activities proved this inaccurate, showing that cultural deposits are distributed in meaningful ways and revealing patterns that can be used to evaluate interpretations about prehistory here in relation to neighboring areas. Testing and mitigation activity has provided more detailed information regarding timing and kind of occupation at the Lakeshore and has opened the door for future work here. It is clear that much potential exists for further understanding the complexities of the southern Lake Michigan cultural landscape, only a tiny fragment of which has been archeologically explored.

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5. ASSESSING ARCHEOLOGY AT INDU

As detailed in Chapter 4, archeological investigation at INDU ranges from incidental discovery of artifacts by tourists or park staff, to archeological excavation of large blocks for purposes of data recovery prior to unavoidable site disturbance. The majority of sites at INDU are known as a result of inventory and testing projects. This chapter summarizes archeological characteristics, including depositional context, threats to the resource, as well as site age and cultural data. It also presents a synthesis of site distribution on the landscape at INDU and how investigatory methods impact the known archeological record. Finally, it assesses INDU's place in the larger region, especially in regard to the Late Prehistoric period.

INDU Site Summary

In general, archeological resources at INDU exist in good condition and have the potential to yield significant information about the prehistoric and historic occupants of the park. The general characteristics of archeological deposits identified to date at the park are summarized here in regard to site size, depth, content, and vulnerability to impact.

Site Size

Archeological projects at INDU have identified sites ranging in size from 15 to 15,000 m2 (Table 5). Those sites with square meters estimated (n=123 out of 229 total) have a mean of 1002 m2. This measure incorporates a few unusually large sites, however; 12PR285 and 12PR632, at 15,000 and 13,200 m2 respectively, pull the mean value for all sites up considerably. In this case, the median represents a better summary of "normal" site size at INDU: 300 m2. In addition, the primary mode of the size distribution is located at 50 m2. While there are a few extensive sites known so far at INDU, the vast majority known at this point are relatively small.

This may reflect small and/or short-term occupations of the lakeshore area by prehistoric groups. It may also, however, reflect landform morphology; site size does appear to correlate with landform and size of "useable" (i.e., non-sloping and dry) area. Beyond these factors, site size is also influenced by the manner in which the archeological record is investigated. More intensively investigated sites tend to have larger site size estimates; most of the sites at INDU have been subjected to shovel test inventory, a technique generally limited to detection of denser portions of sites, while many of the larger sites have been subjected to testing if not data recovery. This is discussed further below.

Deposit Depth

Test excavations in the dunal areas of the park (Frost 2001; Lynott et al. 1993, 1998) have shown artifact concentrations within the upper 30 to 60 cm below surface (cmbs), with artifact densities diminishing below 40 to 50 cmbs. Obvious cultural layers, with buried paleosols and associated artifacts, have not been identified in association with these concentrations. The relationship between time since artifact discard and depth from surface is unclear; post-depositional artifact movement may be significant. It is highly likely that some archeological materials below the concentrations were moved downward via rodent activities (artifacts within recent rodent burrows have been noted during excavation), but the influence of bioturbation is not always obvious (Wood and Johnson 1978). Lynott et al. (1998) report distributions of artifact type by depth for the East Unit Campground excavations, with tables showing different concentration depths at different sites. Lithic and ceramic artifacts at 12PR288, for example, are concentrated between the surface and 30 cmbs, with some artifacts found to 50 cmbs. Artifact concentrations at 12PR295 are most dense between 10 and 60 cmbs, dropping off significantly below that, and 12PR299 showed artifact concentrations within the top 30 cmbs. This variability in concentration depth across sites suggests that perhaps natural processes are not responsible, and thus artifact depth and time since deposition are correlated. It is safe to assume, however, that artifact movement in the loose, unconsolidated sediments of the dunes can occur as a result of a combination of factors. These include the activities of the site occupants (e.g., trampling at the time of, and subsequent to, deposition), as well as natural causes such as tree throws and bioturbation. Artifact distributions within heavier, more consolidated soils of the moraine and lacustrine plains are not as vulnerable to deeper soil-moving processes and are typically concentrated within the top 20 to 30 cmbs (Lynott et al. 1998).

Comparison of the vertical distribution of temporally diagnostic artifacts to soil horizons would help to improve understanding of post-depositional processes. Soil horizons at INDU are associated with visible changes in color and texture test unit profiles. Concentrations of Archaic materials within the B-horizon, with Woodland materials largely within the A-horizon would support interpretations of relatively intact artifact distributions.

Site Content and Function

Artifact classes represented in INDU assemblages include chipped stone debris (i.e., debitage), tools, and points, as well as ground stone tools, ceramic vessel fragments, fire-cracked rock, and botanical and faunal remains. Most sites, recorded as a consequence of inventory projects limited to shovel testing, are known to contain debitage, with fire-cracked rock and ceramics occurring less frequently. Obviously, the most common artifact class is the most likely to be sampled with lower-intensity methods. Both Lynott et al. (1998) and Frost (2001) found that fire-cracked rock, ceramics, projectile points, and other, rarer artifact classes (including features and ecofacts) were found more often in testing phase investigations, incorporating test unit and block excavations.

Numbers from past INDU research in general support this notion. While approximately 30% (n=70) of all sites known (total n=229) at INDU have been found to contain temporally diagnostic artifacts, 82% of those investigated via testing or higher-intensity modes were found to contain temporally diagnostic artifacts (18 out of 22). A

Chi-square value of 30.12, with a significance level below 0.001, indicates a significant relationship between intensity of investigation and occurrence of diagnostic artifacts at INDU. More intensive sampling leads to discovery of rarer diagnostic artifacts. However, this correlation may also reflect the fact that discovery of diagnostic materials encourages greater attention to, and thus more intensive investigation of, individual sites. The management-driven nature of archeological work at INDU favors the former explanation (i.e., decisions on where to test are most often determined by park development plans, rather than solely the presence of intriguing artifacts), but both processes are active at INDU. However, the role of sampling in site interpretation and management decisions cannot be over-emphasized. Table 5 provides information on artifact class, feature morphology, and mode of investigation for all INDU assemblages.

The relationship between intensity of investigation and location of features is also strong. Sites with features recorded (n=9) have a mean excavated area of 25.22 m2. The remainder of INDU sites have, on average, much smaller excavated areas (mean=0.48 m2). In this case, the causal factor in this strong relationship is clear; features found at INDU have been the result of intensive testing. Without the larger samples and contiguous areal coverage available with test unit and block excavation, the chance of finding functionally and temporally diagnostic artifacts and features is small.

The East Unit Campground project (Lynott et al. 1993, 1998) provided opportunity to explore INDU sites in detail previously unmatched and resulted in a greater understanding of the archeological potential of this area. Investigations at sites 12PR285, 287, 288, 295, and 297 indicated the presence of archeological phenomena otherwise unknown here, including features, macrobotanical remains, and faunal materials, in addition to the ceramics, projectile points, fire-cracked rock, and chipped stone debris more commonly found across the park. Recorded features do not conform to those typically witnessed in substantial settlement sites of the larger region, such as large pits and dense middens (e.g., Bettarel and Smith 1973; McCord and Cochrane 2003). Those recorded during the East Unit Campground excavations were primarily small basin-shaped pits or amorphous features, containing charcoal and burnt sand. Charcoal from these features provided dates ranging between approximately 520 and 2200 radiocarbon years before present (RCYBP; see Table 2). Temporally diagnostic artifacts from these same sites correspond with these radiocarbon dates. Sherds and points largely reflect Late Prehistoric occupation, but the Middle Woodland and Archaic periods are represented in the artifact assemblages as well. Macrobotanical remains are largely confined to wood charcoal. Faunal remains are limited and often highly eroded and the research potential of this artifact class is yet unexplored.

Site size and perceived site function are also of interest here. The larger sites at INDU may represent intensive occupations, although series of geographically overlapping (and potentially unrelated) small-scale occupations are more likely (Lynott et al. 1998; Sturdevant and Bringelson n.d.). The majority of sites located as a result of inventory efforts are usually recorded solely on the presence of non-temporally diagnostic materials, such as fire-cracked rock and chipped stone debris, so it is difficult to distinguish between these two possibilities. Level of sampling is also relevant to this issue; Frost (2001) notes that intensively sampled sites were more likely to yield temporally sensitive materials, such as pottery and projectile points. Sites with temporally and functionally diagnostic traits might be used to assess type of occupation: intensive village settlement occupied for a relatively short period or multiple small-scale occupations over time.

Another means of distinguishing between the remains of a high-intensity occupation and the accumulation of debris from a series of low-intensity occupations is the presence of features such as storage or refuse pits and evidence of architectural remains. The low intensity of investigation at the majority of INDU sites precludes discovery of this type of evidence. Shovel test inventories and test unit excavations (discussed further in Chapter 4), combined, provide the largest set of information about the archeological record at INDU. Shovel-test inventory, with intervals of ten to two and one-half meters between each 30-cm wide shovel probe, is meant to provide only preliminary information regarding the presence or absence of archeological materials. Archeological testing provides information on vertical provenience and larger contiguous areas and thus, better chances of discovery and description of features, but sampling is still an issue. Site testing at INDU has shown little evidence of features, but the number of test units at most sites has been relatively low (see Table 5 for details). The East Unit Campground excavations did sample extensively, with 106 square meters opened at 12PR295 (approximately four percent of the total estimated site area). As discussed above, this project supported the interpretation of a series of smaller overlapping occupations. None of the six features recorded at 12PR295 were consistent with the deep storage/refuse pits or remnants of long-term dwellings expected with intensive occupation.

Threats and Impacts

Potential threats and realized damage to archeological resources at INDU are mainly associated with the aeolian processes responsible for so much of the park's unique character and special set of natural resources. Sites located within dune sands can remain intact and protected as long as the vegetative cover is present. Once this surface humus mat is compromised, however, damage can be rapid and severe. Bare spots, caused by natural events such as tree falls or cultural impacts such as foot paths, create conditions favorable to the erosion of loose, fine-grained sediments and can rapidly become large blowouts. Erosion of the fine-grained sediments (presumably sand, but may include small, light artifacts as well) from the overall deposit will leave the heavier clasts, producing a skewed, deflated deposit. Such deposits are also especially vulnerable to casual collection, another source of bias in, and depletion of, the archeological record.

Archeological deposits in the clayey soils of lacustrine and moraine formations are vulnerable to an entirely different set of impacts. Frost (2001) notes that sites in such settings, with their relatively shallow depths of deposit, are most affected by recent cultural activities including land clearing and tillage. He also comments that tree roots in these heavier soils are more concentrated in shallow zones than are those in the dune soils, also impacting archeological deposits. While these impacts on the archeological record can be significant, they do not necessarily nullify the integrity of such deposits. Research indicates that tillage-related processes of fragmentation and artifact movement are not typically severe enough to remove all cultural information (Bringelson 2004; Dunnell and Simek 1995; Redman and Watson 1970; Trubowitz 1978). Given this, and the distribution of most artifacts within the historic plowzone, investigations in heavier soils should incorporate full archeological examination of upper sediments, including the plowzone.

Age and Cultural Affiliation of INDU Precontact Archeology

The INDU archeological record incorporates materials associated with the Late Paleoindian Period (approximately 6500-8000 B.C.) through the Late Precontact and Historic Periods (Table 5). The earliest extent of this record is represented by two provenienced examples: a single Agate Basin lanceolate point found at Chellberg farm (Frost 2001:78-79), and an unfluted lanceolate base reported by Limp (1974) at the Bailly homestead. Private collections from the park area provide additional examples (see Table 3). Archaic period occupation is reflected in the presence of several bifurcate-stemmed and other points associated with the Early Archaic (approximately 6000 B.C.). The Late Archaic/Early Woodland time period (spanning approximately 3000-1000 B.C.) is represented at several sites by characteristic stemmed and side-notched points. Middle and Late Woodland Period occupations are identified by both projectile points and ceramic materials in many locations at INDU. Rocker-stamped pottery characteristic of the Havana Hopewell, as well as various corner and side-notched point styles provide evidence of occupation here during the first millennia AD. A variety of grit-tempered ceramics and small, triangular points show that occupation also occurred here during precontact periods of the mid-millennium as well (see Figures 4 and 6). Ceramic rim and/or decorated sherds show potential ties to adjoining and more distant areas during the Late Prehistoric. A large portion of the archeological record at INDU is composed of less diagnostic ceramic materials: grit-tempered, cord-marked sherds identifiable to the general Woodland (spanning approximately 100 B.C. - A.D. 1600), most likely associated with the latter portion of that span.

Distribution of Archeology at INDU

Commonly Utilized Topographic Settings

Archeological sites have been located across a variety of settings at INDU that can be summarized in reference to slope and proximity to water. Evidence of prehistoric occupation is typically located on flat, dry benches not far from wetlands or streams. The majority of sites currently known at INDU were found in such locations within the dune systems. Elevation on individual dunes vary; many sites are found on or near dune crests (e.g., 12PR297, 12PR298, 12PR366), often on benches or saddles sheltered by hilltops, but sometimes on the hilltops themselves. Some sites are located on benches midway between a dune's top and its base (e.g., 12PR331, 12PR352), while others have been located in relatively low positions at the edges of (or on dry rises within) marshes or bogs (e.g., 12PR326-12PR329, 12PR395, 12PR396, 12PR405, 12PR411, 12PR419, 12LE246, 12LE247).

Other contexts also contain archeological sites. Several sites are located on the terraces of the Little Calumet River (e.g., 12PR109, 12PR505, 12PR509, 12PR510). In addition, a series of sites have been found along Dunes Creek, unique in the area as a waterway that cross-cuts multiple dune systems and topographic settings. Dunes Creek sites include 12PR597 and 12PR603, as well as several currently under investigation (12PR610, 12PR611, 12PR632, 12PR634, and 12PR636).

Archeological Components across the Landscape

Distribution of archeological materials across the landform systems represented at INDU is of interest as well. It is possible that landform use shifted through time with cultural changes in subsistence and community structure. Figure 5 shows locations of historic and prehistoric components at INDU. Combining a digital elevation model (DEM) with this distribution provides an overview of site distribution across landform systems. The three dune ridge formations discussed in Chapter 2 host many sites, and several sites are found on the Lake Border Moraine and along the Little Calumet River as well. Table 5 provides site numbers and other specific information for those that are summarized here. The single Paleoindian component listed is located near the Chellberg Farm (12PR505) on the Lake Border Moraine. The Bailly homestead, as noted earlier, has also yielded evidence of Late Paleoindian Period occupation. However, this component was not incorporated into analyses because its identification was based solely upon the interpretation of a photograph, and was not reported by the investigating archeologist (Limp 1974). Found at the Bailly homestead, it is located on the same landform as 12PR505, so its inclusion would not change conclusions regarding early prehistoric occupation.

One of the four Early Archaic site components is also located on the Lake Border Moraine. The other three Early Archaic sites are situated on or near the Calumet Dune Ridge landform. The only known Middle Archaic component is also on the Calumet, as are all seven Late Archaic (or Late Archaic/Early Woodland) components.

Components identified to the general Woodland Tradition (n=26) are located across all three dune formations, with ten on the Calumet, four in areas transitioning the Glenwood and Calumet dunes, two on Glenwood dunes, and nine on the Tolleston formation. The three components identified as Early Woodland are found on the Calumet dunes; those identified to the Middle Woodland are found on the Calumet (n=4), between the Calumet and the Glenwood (n=1), on the Tolleston (n=2), as well as on the Lake Border Moraine (n=1). Late Woodland components are distributed similarly, with six on the Calumet, one between the Calumet and the Glenwood, two on the Tolleston, and one on recent dunes near the Little Calumet River.

Twenty-eight historic components recorded at INDU are found across all landforms, with 16 on the Calumet, three bridging the Calumet and the Glenwood, two on the Glenwood, one on the Tolleston, three on moraine uplands, one along the Little Calumet River, and one on the Lake plain. The two best-known historic sites, the Bailly homestead and cemetery (ASMIS INDU000224, National Register number 66000005) and Chellberg farmstead (12PR633), are located near each other on the Lake Border Moraine, each adjacent to a creek or river. Another early settler's site, the McDonald farm and cemetery (12PR389), is located on a flat bench in the Glenwood Dune system. Other historic components are spread across landforms and include early 20th century dumps (e.g., 12PR161, 12PR294, 12PR403) and domestic scatters or structural remains, also likely dating to the late 19th to early 20th century (12PR353, 12PR390). Another class of historic resource is more ambiguous, consisting of a mix of prehistoric and historic debris: chipped stone debris and fire-cracked rock found near cut nails or a clay pipe stem (e.g., 12PR419 on the Calumet Dune system, 12PR498 between the Calumet and Glenwood systems). Several of this kind of site have been located with shovel test inventory or reconnaissance level procedures, but little is known of the nature of the deposit and the relationship of the components.

Table 6 shows the distribution of culture historic components across landform systems at INDU. Both culture historic and landform classes were collapsed here in order to derive larger sample sizes in cells across the table and to ease interpretion. Component groups include Early Precontact (defined for this table as late Paleoindian through Early Archaic), Middle Precontact (Middle Archaic through Late Archaic/Early Woodland), Later Precontact (Middle through Late Woodland) periods, general Precontact, and Historic. Landform systems were grouped to a lesser degree: cases found in the Calumet/Glenwood interface are listed under the Calumet Dune system, and sites found along the Little Calumet River are included under the larger landform system through which the Little Calumet travels (either the Lake plain or Recent dunes).

It is interesting that Early and Middle Precontact components found within dune systems are only on the Calumet Dunes, while Later Precontact assemblages are known in the Glenwood and Tolleston systems as well. Whether or not this is behaviorally meaningful is undetermined. It is quite possible this apparent discrepancy in precontact site distribution is causally linked to the history of investigations in the park, i.e., it may simply represent where test excavations have taken place, rather than actual differences in where occupations took place through time.

Table 7 explores this possibility, summarizing the distribution of components across landform systems at INDU in terms of level of culture historic detail available (i.e., whether specific culture historic components are identified or not). The Calumet Dunes contain the largest set of archeological components, and accounts for the great majority of temporally assigned assemblages. Almost half (57 of 131, or 44%) of the total number of components recorded on the Calumet dune system have temporally sensitive materials (i.e., identified to a specific prehistoric period or to the historic period). Only 86 temporally assigned components are currently known parkwide. Those on the Calumet system alone make up 66% of that total. In contrast to the Calumet system, almost all (33 of 37) components found in the Glenwood Dunes are designated as general Precontact. Similarly, 41 of 55 components identified from the Tolleston Dune system are general Precontact. The majority of components identified on the Lake plain, in morainal uplands and recent dunes are assigned to the general Precontact period as well.

Examining the relationship between modes of investigation across landform systems provides perspective on the apparent preference for the Calumet Dunes in prehistory (Table 8). The Calumet has hosted a disproportionate number of intensive investigations (25 of the 30 projects involving test unit or block excavations). As noted previously, this suggests that the higher number of components assigned to a specific culture historical period is correlated with the level of investigation. Table 9, showing general cultural period by level of investigation, also indicates that inventory and reconnaissance (or lower intensity) projects account for 168 of 174 total general Prehistoric components. Conversely, only six components assigned to this general Precontact class were associated with test unit or block excavation. Previous research has suggested this already (Frost 2001; Lynott et al.1998). Greater detail in examination of any locality is likely to reveal more information, including examples of rarer artifact classes that may provide temporal indicators (e.g., ceramics and projectile points).

This brief study merely underlines the fact that the current set of "general Precontact" assemblages known solely through inventory procedures is likely to contain more information than is thus far known. This is also consistent with the staged approach to archeological investigation. Inventory procedures are effective for site identification, and testing is better suited to evaluation and description of previously identified resources.

It is also important to consider the type of inventory used in identification of individual sites. While SAIP-funded inventory results appear to represent the distribution of certain prehistoric behaviors accurately, the extents of such efforts differ significantly from those for ROU and construction-related inventories. The latter group of archeological activity includes individual projects with more limited areal extent and survey zones dictated by park activities. The ROU inventory and testing projects have produced valuable information, increasing knowledge of prehistoric settlement park-wide. However, their distribution does not necessarily represent a random or representative sample of landform and topography. It is possible that this accounts for some perceived differences across space in the record.

In addition, many areas of the park have not been subject to archeological inventory. Although great effort was made to sample across landforms and soil type in Frost's SAIP efforts (Frost 2001), resources to investigate all areas were not available (Frost sampled approximately five percent of the National Lakeshore). For these and the above reasons, it is unrealistic to expect results of archeological investigations to represent all prehistoric behaviors equally across the landscape at INDU.

The Artifact Record and Interpretation at INDU

As mentioned above and discussed at length in Chapter 3, the sample of well-understood sites at INDU is limited and seems at odds with other assemblages through the southern Lake Michigan region. To what extent the lack of intensive occupation in prehistory at INDU is due to sampling, poor preservation, or the nature of past occupation at the Indiana Dunes is not completely clear. While few data are available regarding prehistoric architecture and seasonality of occupation at INDU, the distribution of aboriginal ceramic artifacts is much more ubiquitous. Prehistoric ceramic specimens tend to be small and are sometimes eroded, but on the whole, this group of artifacts can provide information on occupation of the Indiana Dunes area in prehistory and help place it in the context of the larger Lake Michigan region.

Pottery is an excellent material class for interpreting the prehistoric record. Archeologists rely on ceramic presence, distribution, and specific traits to interpret group relations, histories, and lifeways. This artifact class is highly relevant to the interpretation of late prehistory at INDU and how this area was utilized throughout this time, especially in relation to the larger Lake Michigan region.

Because ceramic production is a plastic and additive technology, or one in which material is manipulated to form an object and in which material may be added to alter body form or decorative finish, the final product is largely determined by a series of decisions by the individual maker. This stands in contrast to products of subtractive technology, such as lithic artifacts, in which all modification decisions are limited to removal of material from the whole and in which final form is limited in larger proportion by the constraints of the raw material and parent block dimensions.

Explaining Variation

Several aspects of ceramic production are useful for multiple lines of archeological investigation. Paste and temper of pottery are compared to known material samples in order to test ideas regarding sources of raw materials. Such analyses can aid interpretations about communication between groups, trade of objects, and movement of people across the landscape. Other traits are used to investigate prehistoric technology. For example, strength and hardness reflect on firing technology used. This, in addition to type of temper, vessel shape, and perhaps even surface treatment, may reflect the intended functionality of the product (residue and use-wear analyses are also used as indicators of actual vessel use).

Decorative traits are tied more directly to producer preferences, as opposed to functional and technological benefits or constraints. The less a product or trait is related to such factors, the more it is useful for investigating social issues. Ceramics, especially those rich in decorative traits, are a relatively sensitive indicator of cultural trends, useful for investigating the age of cultural deposits and inter-group relations. Thus, ceramic types are the main vehicle for structuring culture historical interpretation.

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Most precontact ceramic artifacts known from INDU are commonly identified as Late Woodland, though recent examination of the INDU collections has identified a small number of sherds potentially identifiable to the Mississippian or Oneota Traditions (see Figure 8). This, and regional literature regarding distribution of ceramics identified to each set of units, requires some consideration of ceramic traits used in these discussions.

Contrasts between Late Woodland/Upper Mississippian assemblages, outlined in Chapter 3, rely heavily on ceramic traits, including those of paste and temper. Mississippian-type ceramics in the southern Lake Michigan region typically have compact, dark paste tempered with burned shell fragments, resulting in a lamellar or layered texture in cross-section. In contrast, Woodland ceramics generally have somewhat looser, lighter colored paste, tempered with crushed rock or sand. Texture is generally more granular and friable than the shell-tempered Mississippian paste.

While ceramic paste characteristics are quite useful for identifying choices made during manufacture and may align with culture groups, they are also tied to technology and function and can cross-cut culture groups. Grit or sand-tempered pottery is less resistant to fracture than is shell-tempered pottery. Shell temper particles bond during the firing process with the clay body, requiring greater force to produce cracks than in sand- or grit-tempered materials (Feathers and Scott 1989). In addition, shell-tempered ceramics have been found to be less porous and thus more efficient vessels for heating contents than their grit-tempered counterparts (Budak 1991).

However, the successful incorporation of shell temper into a local ceramic technology involves greater complexity than does sand or grit temper. Budak (1991) found shell-tempered clay to be more sticky and difficult to form, requiring greater skill at that stage. Dunnell and Feathers (1991) found evidence to support the need for greater skill to produce shell-tempered pottery in the archeological record as well, noting greater variability in firing temperature and/or duration in sand-tempered sherds. Success in shell tempering requires greater control over forming and firing technology, including the relatively intensive processing of tempering material and/or additional treatment of clay body in order to guard against spalling of the ceramic during the firing process (Dunnell and Feathers 1991; McAllister 1980; Stimmell 1978). In addition, shell-temper in cooking wares may have offset nutritional problems inherent in corn-based subsistence systems (Osborn 1988).

Regardless of the reasons for using these two different technologies, they are most commonly used by archeologists as cultural markers, to distinguish Woodland from Mississippian assemblages. Temper and paste characteristics are available in even the smallest ceramic fragments and are thus the most widely known trait distributions. Decorative traits are also widely known in that decorative elements may be present and identifiable on small ceramic fragments as well, though they will not be present or identifiable on all fragments. These two sets of traits play a large role in understanding social factors at play in the INDU area during late prehistory.

Regional Ceramic Distributions in Late Prehistory

A previous section presents the culture history of the Woodland Tradition and introduces some of the ceramic types recorded in the region. Grit-tempered wares are ubiquitous around the Lake during late prehistory (AD 1000-1600). The early Late Woodland sees the advent of grit-tempered collared wares of similar form occurring in central Indiana (i.e., Albee wares [Winters 1967; McCord and Cochran 2003]), southwestern Michigan (Moccasin Bluff Collared [Bettarel and Smith 1973; McCallister 1980]), western Michigan (Alleghan wares [Kingsley and Garland 1980] and Spring Creek wares [Fitting 1968]), northern Michigan (certain Skeegmog point wares [Hambacher 1992]), eastern Wisconsin (Aztalan Collared and Point Sauble Collared [Baerreis and Freeman 1958; Mason 1981]), and southern Wisconsin to northeastern Illinois (Starved Rock Collared [Hall 1987]). Although variation in exact form across space exists, variation across areas often does not surpass that seen within individual wares or assemblages. The common element of all these wares is the addition of a thin strip of clay around the rim below the lip or the pushing out of material in this area to form a slight collar. In general, these collars are not extreme but they are distinct.

Two decorative traits also often associated with Late Woodland ceramics include cord-wrapped stick impressions on or near the lip and punctuates. These traits show continuity from the Middle Woodland period, where they often co-occur with rocker stamping and zonation of decorative elements. Certain earlier Late Woodland ceramic assemblages illustrate the overlap (e.g., Alleghan Decorated [Kingsley and Garland 1980], Hacklander Decorated [Kingsley 1977]). Both of these decorative elements occur in southwestern Michigan assemblages (Moccasin Bluff, Allegan wares), central Indiana (Albee wares), eastern Wisconsin (Aztalan and Point Sauble wares, Mill phase Lane Farm cord-impressed [Stevenson et al 1997:170]), and northern Michigan (Skeegmog Point and Traverse wares). In addition, impressed lip decorative elements are also indicated for Heins Creek ware of northern Wisconsin, and punctates are recorded in Wayne wares of southeastern Michigan. Appendix 1 provides a list of decorative and technological elements for these and other Late Woodland ceramic assemblages known for the Lake Michigan area, compiled from the regional literature.

INDU Ceramics in Regional Perspective

The majority of ceramics from INDU are grit-tempered and cord-marked. Collared sherds, incised rims and lips, and punctates are known here as well. Many of the rim sherds are consistent with descriptions found in the regional archeological literature, suggesting interaction with groups around Lake Michigan and to the near south. In an effort to integrate knowledge of prehistory at INDU with that in the larger region, images of select sherds were sent, with descriptive information, to several archeologists knowledgeable about prehistoric ceramics of the region. Table 10 lists responses received regarding these sherds, which are represented in Figure 6. Specialists identified correspondence of INDU ceramics with Late Prehistoric (Late Woodland) Moccasin Bluff ware, Allegan ware, and Albee ware

(Illinois River valley), and some Middle Woodland ceramics as well, specifying Havana and Summerville Hopewell types.

Several specimens received divergent identifications. The small number and size of these sherds makes positive identification difficult and there are definite limitations on the examination of images over direct observation in the course of identification, but several observations can be made. First, there appear to be parallel culture units, differing mainly (perhaps only) in the geographic location at which they were first defined. This is especially marked with Late Woodland types. For example, Albee materials, first described in south-central Indiana, overlap descriptively with Moccasin Bluff materials, which are named for the type site in extreme southwestern Michigan.

Contributors apparently offered these type names as points of reference, often accompanying them with culture historical period terminology (e.g., early Late Woodland, late Late Woodland), to point out a set of similar materials for expanded information and comparison. However, readers may confuse this with interpretive intent, taking the identification as indicative of cultural origin (interaction with groups to the south based on identification of Albee wares, east-west migration based on Moccasin Bluff or Alleghan identifications). This kind of interpretation is not necessarily warranted, especially when the difference in identification is tied directly to the analyst and not the ceramic assemblages themselves.

It appears that many of the differences in ceramic identifications for this ceramic sample are related to analyst and his/her particular geographic research experiences. For example, Analyst 1 identified the specimens as wares described initially in Illinois and Indiana, south of INDU. Analyst 2 identified the sample largely as Moccasin Bluff and Allegan wares that were initially described in western Michigan. This correlation supports the identification of specific wares or types for comparative and contextual purposes only. Culture historical interpretations will require further in-depth analyses of INDU and regional assemblages, perhaps including frequency distributions of individual ceramic types (if not traits) across space and time to tease apart culture historical issues.

This exemplifies the ceramic typological systems around the Lake Michigan region, with its series of separately described and named, yet virtually indistinguishable, ceramic types (see Appendix 1 for examples). This is certainly not unique to this region, but the contribution of Lake Michigan to the surrounding cultural geography makes for a special situation. In prehistory, the lake would have facilitated communication and travel over great distances in a north-south orientation. Typological synonyms can easily originate as archeologists with detailed exposure to one part of this region publish on a single or tightly-grouped set of ceramic assemblage(s). It is impossible to confirm complete congruence between types (such as Albee and Moccasin Bluff variants) without in-depth frequency-based analyses of a series of regional assemblages, but it is safe to assume that the two are not completely distinct and may well be culture historically congruent.

Several issues combine to create a confusing situation for pottery analysis in regional perspective: (1) certain traits, such as collaring, cord-marking, and grit temper, are implied in the use of the above nomenclature, mixing traits tied solely to decorative choices (cultural preference) with those tied to technological and functional costs and benefits; (2) the conditions for membership in each named group are not always clear and may vary between analysts; (3) different analysts may be using different names to identify highly similar pottery assemblages. This adds confusion to an already complex archeological record. The synthesis of regional pottery typologies and comparative analysis presented in this chapter (see Appendix 1 and Table 10) represents an initial attempt to unify regional knowledge, and future efforts should incorporate this synthesis into a system for describing and analyzing pottery assemblages.

The situation demonstrated by regional pottery naming systems is paralleled by that of whole assemblages during the Late Prehistoric, including the Late Woodland-Upper Mississippian-Oneota nomenclature and interpretive issues discussed in Chapter 3. Like the above discussion regarding ceramic traits, Chapter 3 presents an attempt to bring assemblage-scale characteristics into focus for the Lake Michigan region. An explicit theory-driven nomenclature system for late Precontact cultural manifestations would be helpful for future summaries and analyses.

Regional Models for Late Prehistoric Land Use

The archeological record for the Late Prehistoric Period at INDU has yet to provide clear evidence (as has been recovered from sites in other parts of the Lake Michigan region) of large-scale and/or semi-permanent settlement. This, added to the dominance of INDU's Late Prehistoric ceramic assemblages by Late Woodland (i.e., grit-tempered) materials (and virtual exclusion of shell-tempered ceramics [but see Figure 8]), distinguishes the archeological record here from the rest of the region.

This raises the interpretive question of what happened in the Dunes area during later prehistory. Why are no settlements of the scale of Fisher, Moccasin Bluff, or Fifield known within the Lakeshore boundaries? Why is there no evidence for intrusive occupation or contact, as in nearby areas? Researchers have posited that the Indiana Dunes area served as a part of a seasonal subsistence and settlement pattern, in which domestic activities for Upper Mississippian groups were limited to the Kankakee marsh system to the south (Faulkner 1970; Frost 2001; Lynott et al. 1998). This is consistent with material distributions, but does not represent all plausible explanations. Several behavioral explanations are presented here. These are not mutually exclusive, but are presented separately in order to focus each clearly for purposes of discussion.

INDU as a Lakeshore Thoroughfare

Transportation routes focus disproportionately around the southern tip of Lake Michigan. The north-south orientation of the lake deflects east-west traffic along much of its 350-mile extent through the Dunes region (Meyer 1954). Besides its role in water-based transport up and down the Lake, it is not surprising that the INDU area intersects overland trails that connect much of the continent as well. The Lakeshore Trail offers the most efficient east-west route just south of the lake, and has been used by various cultural groups through history and prehistory. The Great Sauk Trail runs all the way from New England to Omaha, where it branches to the Santa Fe and Oregon Trails (Meyer 1954), and has served as a major transport route (see also Chapter Three). The Vincennes Trace runs south from the lakeshore area to Vincennes. This trail has a European military strategic origin, though it is surely paralleled by prehistoric transport activity as well.

This convergence of transport routes raises the possibility that the Lakeshore area served primarily as a crossroads for many groups, a factor which may have hindered significant long-term settlement by any one of them. The effects of higher population densities in the surrounding regions during later prehistory may have compounded this influence.

Regional history and late prehistory is consistent with this interpretation. Schurr (2003) points out that, historically, multiple native groups utilized this area and that it was more a crossroads than a territory (see White [2000] for detailed discussion of historic groups). This has been interpreted by some as the fragmenting influence of European contact, but Schurr (2003) suggests that this complex pattern of land use and influences has roots in prehistory. He notes that Late Prehistoric ceramic complexes of the region, such as Albee (traditionally associated with western central Indiana) and Huber (centered around the Chicago area but also similar to wares in southwestern Michigan), have been found to have relatively broad and homogeneous distributions. The nature of their distribution, in combination with the fact that three ceramic styles -- interpreted as originating in northeastern Illinois, southwestern Michigan, and northern Ohio -- co-occur in the Late Woodland here (at the Moccasin Bluff site in St. Joseph County, Michigan), implies the use of this area by multiple populations. He also mentions the fact that most assemblages from this area contain examples of “exotic” pottery, suggesting higher levels of intergroup contact.

Chipped stone artifact analysis can also contribute to this assessment. Distribution of the raw materials used for stone tool production can be used to infer the trade and transportation patterns of prehistoric peoples. It is expected that, if the INDU area served as a thoroughfare through which multiple groups passed from various directions, some non-local raw materials should occur in INDU lithic assemblages. To date, almost no exotic material has been observed in these collections, thus making assessment of this hypothesis more complicated.

INDU as Shared Territory

Hambacher (1992:231) posits that stylistic heterogeneity in ecological transition zones represents the sharing of an area by multiple groups, each using it for a portion of their subsistence needs. Bettarel and Smith (1973) interpret the Moccasin Bluff site as the locus of occupation for multiple, contemporaneous ethnic groups. It is possible that the INDU area, just southwest of that site, may have also hosted multiple groups in the same area. The sample of diagnostic ceramic sherds in the INDU collection share similarities with Albee wares focused to the south, Moccasin Bluff and other wares commonly found around the Lake to the east and north, as well as with grit-tempered wares found around the Lake to the west (Richards and Jeske 2002; Schurr 2003; see also Table 10, Figure 6, and Appendix 1). Perhaps the Lakeshore area was shared by multiple groups, discouraging any single group from placing a large-scale settlement in this region.

INDU as “No-Man’s Land”

The extreme scarcity of shell-tempered ceramics at INDU suggests another explanation: the Lake Michigan shoreline area served as a buffer zone between competing groups. Richards and Jeske (2002) posit this to explain a gap in the record of southeastern Wisconsin (also near the shore of Lake Michigan), noting the close temporal and environmental overlap in assemblages of the surrounding area, AD 900-1400, as evidence of increasing competition for resources during the Late Prehistoric. They note a temporal and spatial overlap of four kinds of ceramic wares: grit-tempered, direct-rimmed wares associated with Effigy Mound cultural assemblages, termed Madison wares; grit-tempered, collared or thickened-rim wares, termed (as discussed here above) Aztalan, Starved Rock, or Point Sauble wares; predominantly shell-tempered wares, grouped by Richards and Jeske (2002:33) as Oneota, that are similar to Fisher and Huber wares in northern Illinois and Indiana, and Caracajou wares in southeast Wisconsin; and shell-tempered wares typical of Middle Mississippian assemblages.

Richards and Jeske (2002) interpret Aztalan as a Late Woodland settlement that was subsequently occupied by Middle Mississippian representatives. Early components characterized by collared (Late Woodland) wares are superseded by Middle Mississippian ceramic types and a restructuring of the site to include defensive palisades and Mississippian architectural hallmarks. While Late Woodland wares may be found at other area sites dominated by one or the other shell-tempered wares (i.e., Oneota versus Middle Mississippian), there is little mixing in assemblages of the two shell-tempered wares, suggesting competition or conflict between Oneota and Mississippian groups. They also note the absence of Oneota assemblages in extreme southeastern Wisconsin, between the Fox River drainage and the Lake Michigan shoreline. In fact, only a few Late Woodland sites are recorded in this area as well. However, the northeastern Illinois region adjacent to the Fox River inland shows heavy usage by Oneota peoples, as suggested by the distribution of Langford ware assemblages. The authors suggest the southeast Wisconsin region served as a buffer zone between conflicting populations and note that northeastern Indiana is interpreted similarly (see Jeske 1990).

This may be the case for INDU. Various Late Woodland wares dominate the assemblages, though a few small shell-tempered sherds occur, suggesting this area was not occupied by Oneota or Mississippian groups. It is quite possible that areas around the Lake's shoreline buffered competing populations, remaining unclaimed by groups distinguished by shell-tempered ceramics and only lightly used by "in-situ" (Late Woodland) groups represented in the record by grit-tempered wares.

INDU as a Short-Term or Ephemeral Use Area

Faulkner (1970, 1972) interpreted the record of the Kankakee valley during the Late Prehistoric as evidence of semi-permanent, seasonal village settlements with presumed hunting and/or gathering counterparts elsewhere in the region. These were assumed to be smaller (on the scale of one or a few nuclear families), shorter-term settlements using wigwam type dwellings that would leave little trace upon removal. This is currently consistent with the record at INDU. The East Unit Campground investigations give the most likely evidence of intensive settlement at INDU to date. Lynott et al. (1998) found no evidence of permanent earthen structures but report small pit features and ceramics. However, these artifact classes are sometimes associated with longer-term or habitually reoccupied domestic settings. In addition, chemical characterization analyses performed on East Unit Campground ceramics suggest that some of the vessels were made locally, another trait supporting broader use of this area.

The preponderance of grit-tempered sherds in the small ceramic sample from INDU may be linked to functionally differentiated uses by different groups. Perhaps local Late Woodland groups used this area more intensively than did members of intrusive Upper Mississippian or Oneota groups. It is quite possible that the use of this area by each group was ephemeral and functioned so differently in divergent subsistence and settlement systems that no overlap occurred, thus supporting environmental over social explanations for the light archeological record of the INDU area.

Evaluating Explanations of Regional Land Use

Evaluating these interpretations will involve layers of analysis. All of these explanations are based on the assumption that the known archeology at INDU accurately represents the total archeological record. Determining whether or not occupation in the Lakeshore area was indeed as sparse as is traditionally thought will depend on continuing work. As the cumulative sample of archeology grows, so will our ability to evaluate this perception. The hypothesis that the Lakeshore occupation was significantly different from that in surrounding areas (i.e., lacking in continuous or intensive occupation) can be rejected by the discovery of particularly dense deposits, as have been found elsewhere. The East Unit Campground work made progress toward this and actually represents the first work with the potential to test this hypothesis, but has not soundly rejected it.

Differentiating between each of the interpretations outlined above requires more fine-grained data and analyses. There is considerable overlap between potential evidence of each of the options offered. A travel-way used by multiple groups, a territory shared by multiple groups, buffer zone between competing groups, and an area used in highly specialized and low-intensity manners by multiple groups all might be supported by the same evidence (as is currently the case). Even given increasing samples of the INDU record, research will need to delve into high-resolution methods and techniques in order to resolve such questions. Testing the travel-way hypothesis might involve analyses of lithic assemblages for non-local materials. Identification of lithic artifacts to source, in combination with stylistic and technological analyses could shed light on distance, direction and consistency of travel.

INDU as a shared territory versus a buffer zone might be set up as alternative hypotheses, using ceramic stylistic analyses to address the concept of territorial behavior. If INDU was used as a shared territory between cooperating groups, the record should reflect an increase in trait interchange or diffusion between ceramic assemblages. If, on the other hand, this area separated unfriendly competitors, one might expect to see increasingly marked style boundaries through time during the Late Prehistoric time period.

The hypothesis that groups used the INDU area in low-intensity, special-use, or ephemeral ways might be tested as an environmental alternative to socially-based explanations. Evidence supporting this explanation might include a record showing different uses of the area by different groups at different times of the year. For example, seasonality and subsistence indicators (e.g., botanical or faunal materials) could be used to test this argument. Evidence supporting social explanations (such as those mentioned above) would weaken this argument.

These are only starting points for research with the potential for revealing uses of the INDU area during the Late Prehistoric period. Evaluating these or other interpretations depends on the distribution and kind of data recovered in future investigations. Botanical and faunal evidence, so useful for interpreting seasonality and intensity of occupation, are thus far very scarce at INDU. Any representation of these artifact classes in data sets would be especially valuable. Lithic data, including small debitage, can contribute to assessing inter-area relationships and site function. In addition, increasing ceramic data will help to strengthen understanding of cultural relationships. As the ceramic sample increases, association of this artifact class with others and added information on site structure will be vital to understanding the nature of individual occupations at the Lakeshore. Single sherds recovered from blowouts provide valuable nominal level information on the presence of a particular ceramic style or attribute, but high-quality ceramic assemblages recovered during systematic data collection will provide quantitative information, giving better means of testing ideas about the nature of prehistoric occupation. This kind of information is necessary to truly evaluate explanations concerning prehistoric land use at INDU.

Summary

This chapter synthesized information on archeology at INDU and assessed its level and quality. Archeological sites at INDU are most commonly found on flat areas in proximity to water and usually occur in the dunes on benches or saddles near dune crests as well as on slight rises above wetlands, but also in moraine and lacustrine plain soils. Archeological materials are found on the surface and up to 60 cm below. Aeolian forces pose the largest single threat to site integrity. In general, archeological sites at INDU are in good condition, unless impacted by erosion triggered by removal of surface vegetation from sandy settings.

The Park contains evidence for about 10,000 years of sporadic occupation and use of the southern Lake Michigan shore area. The distribution of archeological materials across the complex landscape at INDU can help us understand use of landforms through time in the Indiana Dunes area, but the nature of archeological investigation contributes to that apparent distribution in important ways. Assessing past human activity across landforms will require additional sampling of the archeological record and understanding the kinds and timing of activities calls for more site testing.

The INDU archeological record is critical to understanding this area's relation to the larger Lake Michigan region throughout prehistory. Examination of regional pottery descriptions and analysis of diagnostic pottery fragments from INDU indicate possible cultural ties to multiple areas. Consideration of several explanations for this record indicates that much is still unknown. Further study will strengthen understanding of the intensity and type of relationship between Indiana Dunes and other areas in the Lake Michigan region.

The various programs of inventory, testing and data recovery at INDU in recent years have drastically increased knowledge of – and an appreciation for the potential of – the archeological record that far exceed expectations based on early inspections of INDU (Honerkamp 1968). Additional work will continue to open new vistas to the past at INDU.

6. RECOMMENDATIONS

The archeology of the Indiana Dunes area is highly reflective of the unique environs of the Dunes. The varied topography and natural resources packed into this relatively narrow strip of land along Lake Michigan's south shore create a setting for equally varied human activity. Research on this topic over the past century has revealed much about past human activity of this landscape and work in recent years has greatly expanded our notion of how people have used the Indiana Dunes area. We now know that people have occupied this area throughout the Holocene, that in late prehistory more than one group used this area, and that substantial occupation of certain areas was possible. Perhaps people intensively occupied a given locality in a single episode, but it is more likely that most of the archeological sites result from repeated visits to certain landforms over long periods of time.

Recommendations for archeological resource management are divided into three themes: (1) Archeological Resource Studies, (2) Archeological Information Management devoted to coordinating and managing archeological data and making it accessible, and (3) Special Studies and Interpretation: strategies directed toward formulating hypothesis that address the deficiencies in knowledge and interpreting the results of archeological research. Many of the items defined within each group of recommendations are not mutually exclusive and may be implemented jointly. These recommendations are presented in no particular order.

Archeological Resource Studies

Archeological resource studies should be formulated to achieve management objectives and develop a more complete inventory and evaluation of archeological resources within INDU. The primary goals of this study group are to fulfill obligations and requirements described in the numerous legislative mandates, NPS directives, and regional plans for NPS units.

- Conduct additional archeological inventory of landforms to increase the totals for area inventoried and number of known archeological sites within the park. This recommendation corresponds to goals and plans on park, regional, and national levels. Archeological site inventory activity supports goal IB2a of the Government Performance and Results Act (GPRA). Increasing inventory-based knowledge of additional landforms in INDU is of regional importance and thus qualifies as a priority in the Midwest Region Systemwide Archeological Inventory Plan (SAIP) (Midwest Archeological Center 2003:V-1). This recommendation also corresponds with a proposal submitted by INDU in the Project Management Information System (PMIS number 41656).

- Increase the number of known archeological sites that have been evaluated via controlled archeological test excavations. This recommendation corresponds to

Section 110(a)(2) of the National Historic Preservation Act, and Section 6(B)(2)(b) of NPS-28:Cultural Resource Management Guideline (Release No. 5, 1997), both of which support evaluation of archeological sites for eligibility to the National Register. Archeological site evaluation is also integral to INDU PMIS project number 41655. Expanded sampling at sites can also improve the chances of recovery of temporally and functionally diagnostic features and artifacts. Even modest increases in the total area excavated over inventory level investigations have produced significantly more detailed information about sites at INDU.

- Explore options for slowing or stabilizing erosional processes at known archeological sites. There are several locations at INDU at which archeological materials are exposed and deposits are deflated as aeolian agents work to remove fine sediments from around artifacts. Potentially important information about these sites is irretrievably lost as a result.

- Test the feasibility of remote sensing techniques for management and investigation of archeological resources. Near-surface techniques, such as geo-magnetics, electric resistivity, and ground-penetrating radar, combined with low-altitude aerial reconnaissance, may provide additional means for identifying sub-surface archeological resources or historic features such as trails.

Archeological Information Management

Information management is defined broadly here, including incorporation of all available geospatial data relevant to archeology at INDU. Using a combination of several existing databases (ASMIS, Re:Discovery, INDU GIS, INDU ROU), information integration of available data would assist in project planning and make archeological investigations more efficient.

- Update ASMIS. The NPS Archeological Sites Management and Information System (ASMIS) is the primary database used for archeological sites information management. All sites recorded within INDU must be entered into the ASMIS database within three months of discovery and maintained with current information on site conditions, ongoing impacts, level of documentation, chronological information, and all references to archeological investigations.

- Provide a known condition and maintain current condition assessments on all archeological sites entered into the ASMIS database. This is consistent with GPRA goal 1a8, and the Midwest Region Site Condition Assessment Plan (2005). Current draft guidance instructs that site condition assessments be redone on a schedule that may range from every year to every 15 years, depending largely on observed impacts and threats to individual sites.

- Incorporate all known archeological sites (including isolated finds) into a GIS database. This database should be linked to the information provided and kept current in the ASMIS database.

- Incorporate all archeological investigation project areas into the GIS database. This includes all ROU inventory and testing, SAIP inventories, monitoring activities, and reconnaissance areas. The archeological survey information should be linked with the archeological site specific information contained within ASMIS.

- Integrate historic data sources into the GIS database. Information collected during the early to mid 20th century on the distribution of the historic and archeological records is available from the works of Norman Bergendahl, Glen Black, Eli Lilly, and Alfred Meyer. Information gleaned from the INDU Archeological Photo Project files should also be integrated as much as possible.

- Incorporate uncataloged archeological collections into the NPS Re:Discovery database. Catalog records provide information and accountability on artifact and archive collections generated by archeological investigation. A catalog summary of INDU materials held at MWAC indicates that 19 collections have not been completely cataloged. While some of these collections are rather small (e.g., incidental finds), this task should not be underestimated, nor should its importance.

Special Research Topics and Interpretation

- Continue to refine the chronology of prehistory represented at INDU. Several distinct episodes of prehistoric archeological complexes seem to be underrepresented in the archeological record, primarily Early Woodland, Middle Woodland, and Late Prehistoric (Upper Mississippian).

- Whenever practical, collect and submit radiocarbon or other radiometric dating samples from unambiguous and appropriate contexts. This often means intact features with charred wood useful for radiocarbon dating, but may also include other radiometric techniques, such as luminescence dating of prehistoric ceramics. All such efforts require control over sediment context of material submitted and collection of samples should be anticipated accordingly (see Feathers 2003; Lynott and Perry 1984). The lack of radiometric samples and dates has slowed the development of prehistoric chronology for the park.

- Develop and test research hypotheses that address questions of site function. Although the archeological data collected at INDU has been used to provide a general chronology of human activity in the Indiana Dunes area, we know relatively little about the specific function(s) (hunter-gather base camp, special-use site, tool making site, etc.) of most sites recorded in the park. Limited progress toward this goal is seen in current work (Sturdevant and Bringelson n.d.) and future work should build on this.

- Continue to address questions of prehistoric occupational seasonality, resource use, and variability in land-use between the multiple ecozones contained within the park.

- Continue to integrate the Indiana Dunes area into the prehistory of the Lake Michigan region. The archeological resources preserved at INDU contain a significant record spanning over 10,000 years of prehistory. These resources represent a distinctive opportunity to learn from and study prehistoric lifeways and human use of the immediate area surrounding southern Lake Michigan. As outlined in Chapter 2, the uniqueness of the natural environment preserved at INDU is paralleled in importance by the most intact archeological record of the southern Lake Michigan shoreline area.

- Explore Protohistoric and early Historic period occupation by Native Americans. For example, the Joseph Bailly homestead area is known historically to have served as a trading post during the early to mid 19th century. Despite the extent of archeological work performed in that area (Tables 4 and 5), no direct evidence of Native American, fur-trade related activity has been identified there. We anticipate that historic Potawatomi sites should occur within the park, near Bailly or elsewhere.

- Expand the focus of archeological investigations to include historic sites with themes addressing 19th century migration, settlement, and ethnicity. Areas of interest might include additional investigation at the Bailly Homestead, Chellberg Farm, the Swedish Heritage properties, and City West.

- Expand interpretation of past human activity at INDU. As archeologists continue to learn about past peoples in the Indiana Dunes area, it is important to keep interpretation current with research. Archeologists and interpreters can work together to achieve this goal, focusing on public talks by archeologists working in the park, interpretive materials generated directly from the products of archeological research at INDU, and increased interaction between archeologists and interpreters. The current program of cooperation between INDU staff and project archeologists sets an excellent foundation for the achievement of these goals.

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TABLES

Table 1. Pottery ware nomenclature in the Lake Michigan area. See Appendix 1 for citations and type descriptions.

	Generalized Pottery Traditions	Indiana Dunes National Lakeshore	SW Michigan (St. Joeseph River Valley)	SW Michigan (Kalamazoo River Valley)	W Michigan (Muskegon River Valley)	N Michigan (Skegemog Point Site)	SE Michigan	SE Wisconsin	NW Indiana (Upper Kankakee River Valley)	NE Wisconsin	NE Illinois
Protohistoric/ UpperMississippian/ Late Late Woodland A.D. 1400-1700	**Oneota/ Protohistoric:** All Shell Tempered **Late Woodland Upper Mississippian/ Protohistoric:** Grit Temper, Conical to Semi-Globular vessels, Impressed Exterior Lip and Scalloped Rim Decorations	??? ???	??? ???	??? ???	??? ???		???	**Shell Temper**: Oneota Wares **Grit Temper**: Oneota Wares ? ???	**Shell Temper w/minor use of Grit**: Huber Wares	**Shell Temper**: Oneota Wares **Grit Temper**: Oneota Wares w/scalloped and impressed interior rim decorations	**Shell Temper w/minor use of Grit**: Huber Wares
Late Late Woodland/ Upper Mississippian A.D. 1000-1400	**Upper Mississippian:** All Shell Tempered **Late Woodland/ Upper Mississippian:** Grit Temper, Globular to Semi-Globular vessels, Impressed Exterior Lip and Scalloped Rim Decorations **Late Woodland Cont.** Grit Temper, Semi Globular to Globular, Cordmarked, Collared Rims, Various Decorations	**Shell Temper**: Untyped Wares Possibly Huber or Berrien wares	**Grit Temper:** Moccasin Bluff Impressed Exterior Lip, Scalloped, Notched Applique Strip, and Modified Lip Varieties **Shell Temper**: Berrien Ware	**Grit Temper:** Moccasin Bluff Scalloped Rim and Untyped Castelated	**Grit Temper:** Moccasin Bluff Scalloped Rim and Untyped Castelated	**Grit Temper:** Traverse Ware with various rim and lip decorations	**Grit Temper:** Collard and castelated wares: Owasco Sequence Wares or southwestern Ontario types	**Shell Temper**: Upper Mississippian Wares	**Grit Temper**: Langford Wares **Shell Temper**: Fisher and Fifield Wares	**Shell Temper**: Oneota Wares **Grit Temper**: Oneota Wares w/scalloped and impressed interior rim decorations	**Shell Temper**: Fisher and Fifield Wares **Grit Temper**: Langford Wares
Early Late Woodland A.D. 600 - 1000	**Early Late Woodland:** Grit Temper, Conical to Globular, Cordmarked, Collared Rims, Various Decorations	Cordmarked and collared wares similar to Moccasin Bluff, Allegan, or Albee Wares	Moccasin Bluff Cordmarked, Collared, and Modified Lip Wares	Allegan Cordmarked, Collard Wares	Spring Creek Wares	Bowerman and Skegemog Wares	Wayne Wares	Madison Wares: Aztalan Collared, Point Sauble Collared, and Madison Cordmarked	Albee Wares: Albee Collared and Cordmarked Varieties	Heins Creek Wares	Starved Rock Collard and Madison Wares
Middle Woodland 200 B.C. - A.D. 600	**Hopewellian or Middle Woodland:** Grit Temper, Conical vessels, Rocker-Stamped, Hopewell-like	Havana Wares and Green Point Rocker Stamped	Various cormarked and punctate decorations, rocker stamping, and Havana Plain	Lake Forest-like and Hacklander Rocker and Dentate Stamped	Unkown	Lake Forest Wares and/or Hopewellian Wares	Green Point Wares with various stamped and incised decorations	Havana-like Wares: Shorewood Cord Roughened and Kegonsa Stamped types	Morton Wares: Incised and Sister Creek Punctated Havana Wares:Cordmarked and Plain	Lake Forest Wares: North Bay	Havana Wares with various stamped and incised decorations
Early Woodland B.C. 1000-200	**Early Woodland:** Sand or Grit Temper, Thickened, Conical Vessels, Cordmarked - can have minor decoration (i.e. incised over cordmarking)	Marion Thick	Marion Thick	Marion Thick	NA	NA	Schultz Thick or Shiawassee Wares	Marion Thick and Dane Incised	Fayette Thick or Marion Thick	Dane Incised	Fayette Thick or Marion Thick

Table 2. Radiocarbon dates derived from INDU samples. Adapted from Lynott et al. 1998, Table 8.

Site Number	Intra-Site Context	RCYBP	Lab Reference Number
12PR288	Feature A	2170 ± 70	Beta-41642
12PR288	Feature B	520 ± 50	Beta-41643
12PR288	Feature 1	660 ± 50	Beta-41644
12PR287	Feature 2	550 ± 50	Beta-44483
12PR295	Feature B	700 ± 40	Beta-44484
12PR295	Feature C	2120 ± 40	Beta-44485
12PR295	Feature D	1300 ± 60	Beta-44486
12PR295	Feature E	960 ± 40	Beta-44487
12PR297	Feature 1	860 ± 60	Beta-57415
12PR297	Feature 2	940 ± 70	Beta-57416
12PR297	Feature 3	820 ± 50	Beta-57417
12PR297	Feature 5	2390 ± 70	Beta-57418

Explanation: all dates are shown as uncalibrated, radiocarbon years at 1 standard deviation error factor.

Table 3. Summary of information collected during INDU Archeological Photography Project, 1979-1983. Several of these likely originate within or overlap modern INDU boundaries (e.g., Collections 79-5, 81-11, 83-15).

Collection ID	Est. no. artifacts	Collection location	Culture historic span
79-1	53	T36NR6W12	Early Archaic-Late Woodland
79-2	34	Porter county, Demotte IN (S. of Kankakee)	Early Archaic-Late Woodland, Upper Mississippian
79-3	4000	Porter county	Late Paleo-Indian/Early Archaic – Late Woodland, Mississippian
79-4	8	State Park on/near beach and surrounding dunes	Middle Archaic- Middle Woodland
79-5	6	Ogden dunes area	Middle – early Late Woodland
79-6	150	Chesterton	Paleo-Indian – Proto-Historic
79-7	77	?	Early Archaic – Late Woodland, possibly Mississippian
79-8	640	Chesterton	?
80-9	0	Indian Camp trail and Diana Roads (now fire plug)	middle – early Late Woodland
81-10	39	Chesterton	Paleo-Indian – Proto-Historic
81-11		extreme NW IN (locations 51-200="Sand Dunes of northern Indiana"	Late Paleo-Indian – Late Woodland, Upper Mississippian
81-12	377	T35NR6W34, Union Twp	?
81-13	637	Chesterton quad, Portage quad	early Middle Archaic – Upper Mississippian
83-14	2502	37 sites, primarily from around Chesterton and Portage	Paleo-Indian – Late Woodland, Upper Mississippian
83-15	60	Dune Acres, Bethlehem Steel	Early Archaic – late Middle Woodland

Table 4. Archeological project summary for INDU.

Fieldwork Year	MWAC ACC	INDU ACC	Principal Investigator	Work Type	Edited Description	Reference
1974	645	392	Johnson	reconnaissance	Surface reconnaissance of West Beach area.	Johnson 1974a, 1974b
1976	692	393	Keller	testing	Investigation of a brick feature on the floor of Bailly House during restoration	Munson and Crouch 1976; Calabrese 1976a
1976	694	395	Blee/ Bennett	testing	Excavations at the Bailly Cemetery to assess structural damage & investigate the positional sequence at the cemetery	Clemenson et al 1976
1979	693	394	Richner	inventory	Survey of proposed drill sites	Richner 1979
1984	106	348	Aldenderfer/ Brown	inventory	Shovel testing at (12LE144) East unit transit Ct., Paul H. Douglas Environmental Ed Ct., Bailly Unit Porter Sewer line	Doershuk 1984; Pope 1984
1985	121	349	Lynott	monitoring	Monitor trench for installation of electric lines at the Bailly Homestead Site.	Lynott 1985; Wobbenhorst 1984, 1985
1987	-	-	Richner	monitoring	Chellberg house porch renovation, June 1987; artifacts in fill to park historian	Ehn 1987
1988	271	350	Richner	inventory, reconnaissance	Chellberg farm drainage improvement, Good fellow camp “challenge course”, Little Calumet River footbridge, Miller Woods proposed trail, proposed parking area expansion at Mt. Baldy and visual inspection of 12PR115	Richner 1988; Kawamoto 1987
1988	-	-	-	incidental discovery	Basketry fragment found on beach near Mount Baldy	Partsch 1988

Table 4. Continued

Fieldwork Year	MWAC ACC	INDU ACC	Principal Investigator	Work Type	Edited Description	Reference
1989	346	351	Lynott	inventory, testing	Survey & testing of 12PR285, 12PR286, 1989-3, 12PR287-12PR298, 1989a and 1989b; East Unit campground	Lynott et al 1993; Lynott and Frost 1997
1989	-	-	-	incidental discovery	Pottery found in new trail near Beverly Shores	Ehn 1989
1990	348	352	Lynott	testing	Testing for proposed east unit campground - 12PR285-12PR288, 12PR291, 12PR293, 12PR295, 12PR297, 12PR298, 12PR299	Lynott et al 1993; Lynott and Frost 1997
1990	359	355	Lynott	testing, mitigation	Excavation for mitigation of construction of east campground unit 12PR288 and 12PR295	Lynott and Frost 1997; Lynott et al 1998
1990	363	356	Lynott	inventory, testing	Survey of county line road and West Beach interchange, realignment (12PR296) (12PR111)	Lynott 1990
1991	389	360	Clark	inventory, testing	Chellberg Farm 91-1 (12PR491), 91-2 (12PR492), 91-3 (12PR493), 91-6 (12PR494), 91-7, 91-8, 91-9. From E. Ehn 89-2, 89-12, 89-16.	Clark 1991
1991	-	-	-	incidental discovery	Phone call concerning incidental finds on property in Chesterton	Partsch 1991
1992	473	-	Lynott	inventory, testing	Survey & shovel tests along Glenwood, Calumet & Tolleston Dune Ridges. 1st year of multi-year inventory of archeological resources. (12PR161) (12PR238) (12PR239) (12PR300)	Frost 2001

Table 4. Continued

Fieldwork Year	MWAC ACC	INDU ACC	Principal Investigator	Work Type	Edited Description	Reference
1992	478	-	Lynott	testing, mitigation	Excavation of sites on Loop B of east unit campground (12PR297) (12PR298) (12PR299)	Lynott and Frost 1997
1993	513	377	Lynott	inventory, testing	2nd year of multi-year inventory of archeological resources at INDU, East unit only (12PR111) (12PR354) (12PR449) (12PR109)	Frost 2001; Schenk 1992a, 1992b
1993	622	387	Lynott	testing	Harvest Fest, excavation of 1x1 meter unit during public outreach event Bailly House (12PR123)	MWAC accession records
1994	548	380	Lynott/ Frost	inventory, testing	3rd year of multi-year inventory of archeological resources at INDU, (1994-1 to 1994-18)	Frost 2001
1994	578	386	Lynott	testing	Excavation of 1x1 meter unit at public outreach event at Bailly homestead (12PR123)	MWAC accession records
1994	581	383	Richner	reconnaissance	Condition assessment of McDonald Cemetery damaged by vandals	Richner 1994; Frost 1995
1994	-	-	Lynott	inventory	Shovel testing and survey for Long Lake overlook and Pinhook Bog dam removal	Lynott 1994
1995	623	388	Lynott/ Frost	inventory, testing	Survey & shovel testing in Bailly Homestead area and testing of selected pre-recorded sites (12PR303, 306, 362, 394); repair damage at historic cemetery; artifact find at 12PR506 (MWAC 623B)	Lynott and Frost 1997; Frost 1995

Table 4. Continued

Fieldwork Year	MWAC ACC	INDU ACC	Principal Investigator	Work Type	Edited Description	Reference
1995	624	389	Frost	testing	Harvest Fest excavation of 1x1 meter unit during public outreach event, Bailly House (12PR123)	MWAC accession records
1996	629	390	Frost	inventory, testing	Survey of Good Fellow Camp - Cluster 1, sewer line, road & picnic shelter (12PR512), and surveys of several structural demo/ reservation of use properties. (12PR515)	Frost 1996
1997	731	405	Schurr	monitoring	Monitoring drill holes related to foundation repair planning at the Bailly Homestead.	Schurr 1997
1997	816	401	Jones	inventory, testing	Excavation at Bailly Farm Complex during Harvest Festival, inventory at headquarters and at 7 ROU tracts	Jones 1997
1997	827		Richner	incidental discovery	Materials recovered from West Beach area (12PR596)	Frost 1997, Ehn 2002
1997	849	400	Richner	inventory	Shovel testing at various (ROU) tracts (41-142, 39-180)	MWAC accession records
1998	750	409	Frost	inventory	Inventory at ROU tracts, Little Calumet River trail sites, Goodfellow Camp	Frost 1998
1998	817	417	Jones	testing	Testing at Bailly Farm during Harvest Festival	MWAC accession records
1999	844	419	Lynott	inventory	Survey for Goodfellow Camp and Tract 39-113.	MWAC accession records
1999	864	425	Stadler	inventory, testing	Test excavations at Tract 39-113, shovel testing at 39-124	Stadler 1999

Table 4. Continued

Fieldwork Year	MWAC ACC	INDU ACC	Principal Investigator	Work Type	Edited Description	Reference
1999	879	423	INDU Maintenance employees	incidental discovery	Projectile point base found at Tract 36-127, after excavation of septic tank	Ehn 1999a, 1999b
2000 (accession date)	877		Richner	incidental discovery	Accidental discoveries of prehistoric artifacts along INDU trails.	MWAC accession records
2000	906	426	Stadler	inventory, testing	Test Excavation of Site 97-2 at Tracts 39-121 and 39-180 (12PR603), Chellberg Farm overflow parking expansion shovel testing, ROU's shovel testing.	Stadler 2000, 2002a
2001	932	428	Stadler	inventory	Misc. projects -- ROU investigations Kemil Rd. Intersection, Central Beach, Chellberg utility line.	Stadler 2001a, 2001b, 2001c, 2002a
2001	948	427	Slupski	inventory	Inventory of Tract 39-163 in the Pottowattomie subdivision. 5 shovel tests performed.	Slupski 2001
2001	951	429	Stadler	testing	Test excavations at site 2001-1 at Kemil Road/ Hwy 12 (12PR608)	Stadler 2001b, 2002a
2001	-	-	Richner	incidental discovery	Point found in off-road vehicle trail near Hobart Prairie	Ehn 2001
2002	982	430	Stadler	inventory, testing	Excavation and shovel testing at various locations; 12PR513, 12PR603, 12PR611, Bailly Brick House, Chellberg Farm, 12PR287, 12PR301. Accession includes approx. 3000 artifacts in good condition and associated photographs and field documentation.	Stadler 2002b; Sturdevant 2004c

Table 4. Concluded

Fieldwork Year	MWAC ACC	INDU ACC	Principal Investigator	Work Type	Edited Description	Reference
2002	995	432	Ehn, Slupski, Weider	reconnaissance, inventory	ROU tracts 41-122, 41-107, 41-133, 37-134	Ehn 2002
2003	1018	433	Sturdevant	inventory, testing	Shovel test inventories and test excavations at various locations: Porter Trail extension, ROU tracts 109-15, 109-16	Sturdevant 2003a, 2003b
2004	1052	433	Sturdevant	inventory, testing	Inventory and testing: Mt. Baldy parking lot, Headquarters, ROUs; 12PR597, 603, 611, 632, 2004-1	Sturdevant 2004a
2004	1053	434	Richner	inventory	ROU 38-133, now 12PR634	MWAC accession records
2004	1072	436	Sturdevant	reconnaissance	Four ROU inventories, Pinhook Bog entrance road adjustment, road reconnaissance, Harvest Festival table	Sturdevant 2004c
2005	1087	-	Sturdevant	inventory, testing	ROU locations and road removals	Sturdevant 2005a
2005	1100	440	Sturdevant	inventory, testing	Inventory and testing of two Swedish heritage properties: Lindstrom/Wahl and Johnson/ Nelson farms	Sturdevant 2005b
2006	1123	441	Ehn	inventory	ROU inventory at tracts 19-152, 34-118, 49-164, 100-28 (formerly 100-17)	MWAC accession records

Table 5. Site Summary: all sites, INDU.

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
National Register No. 66000005; ASMIS INDU000224 (Bailly homestead and cemetery)	test		H	hist	Lake Border Moraine	Calabrese 1976b; Clemensen et al. 1976; Frost 1995; Honerkamp 1968; Jones 1997; Limp 1974; Lynott and Frost 1997; Munson and Crouch 1976; Schurr 1997
12LA419	st inv.	--	P	csd	lacustrine plain	Frost 2001
12LA420	st inv.	25	P	csd	recent dunes	Frost 2001
12LA421	st inv.	50	LW	ppt, csd	Little Calumet River/ recent dunes	Frost 2001
12LA422	st inv.	25	P	csd	recent dunes	Frost 2001
12LA423	st inv.	--	W	cer	Tolleston	Frost 2001
12LE246	st inv.	--	P	csd	Valparaiso Moraine	Frost 2001
12LE247	st inv.	--	P	csd	Valparaiso Moraine	Frost 2001
12PR109	recon; st inv.; test	-- (5/8 x 1/4 mile)	MW; H	gst, ppts, cst, mussell shell, fcr, csd, hist	Calumet	Frost 2001; Honerkamp 1968
12PR110	recon	--	LA/EW	ppts, csd, cst		Honerkamp 1968
12PR111	recon	--	P	fcr, csd	Calumet	Frost 2001
12PR112	recon	--	P	csd, fauna	Calumet	Honerkamp 1968
12PR113	recon	--	P	csd	Calumet	Honerkamp 1968

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR114	recon; st inv.	--	W; H	fcr, csd, cer, hist	Calumet	Frost 2001
12PR115	recon	--	P	csd, cst	Calumet	Honerkamp 1968
12PR116	recon	--	P	csd, fauna	Calumet	Honerkamp 1968
12PR117	recon	--	P	csd, cst	Calumet	Honerkamp 1968
12PR118	recon	--	P; H	csd, ppt, hist	Calumet	Honerkamp 1968
12PR161	recon; st inv.	--	W; H	fcr, cer, csd	Calumet	Frost 2001
12PR238	st inv.	75	P	fcr, csd	Glenwood	Frost 2001
12PR239	st inv.	--	P	fcr, csd	Glenwood	Frost 2001
12PR285	test	15000	W	csd, fcr, cst, cer, fauna, macrobot, feature	Calumet	Lynott et al. 1993
12PR286	recon, st inv.	--	P	csd	Calumet	Lynott et al. 1993
12PR287	st inv.; test	2250	W	features, fcr, csd, cst, cer, fauna, macrobot	Calumet	Lynott et al. 1993
12PR288	stripped pz; test	--	EA, LW, UM(?)	features, ppts, cer	Calumet	Lynott et al. 1998; Lynott et al. 1993
12PR289	recon	--	P	fcr	Calumet	Lynott et al. 19933
12PR290	surf inv.	--	P	csd	Calumet	Lynott et al. 1993
12PR291	surf inv., st inv., test	--	P	csd	Calumet	Lynott et al. 1993
12PR292	surf inv.	--	P	csd	Calumet	Lynott et al. 1993
12PR293	surf inv., test	--	P	csd	Calumet	Lynott et al. 1993

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR294	recon	--	H	hist	Calumet	Lynott et al. 1993
12PR295	st inv.; test	--	EA; LA/EW; MW; LW	features, cer, ppts, csd, fcr, fauna, macrobot, cer	Calumet	Lynott et al. 1998; Lynott et al. 1993
12PR296	st inv.; test	--	LW	cst, csd, cer, fcr, fauna	Calumet	Lynott et al. 1993
12PR297	st inv.; test; data rec.	--	LA/EW; LW	ppts, features, csd, fcr, cer	Calumet	Lynott et al. 1998; Lynott et al. 1993
12PR298	st inv; test	150	MW; LW	feature, ppts, cer	Calumet	Lynott et al. 1998; Lynott et al. 1993
12PR299	st inv; test; mitigation	150	LMW	fcr, csd, ppt, cer	Calumet	Lynott et al. 1998; Lynott et al. 1993
12PR300	st inv.	small, low density	H	hist	Calumet	Frost 2001
12PR301	st inv.	50	P	csd	Glenwood	Frost 2001
12PR302	st inv.	50	P	csd	Calumet	Frost 2001
12PR303	st inv., test	420	LW	csd, cer, ppt	Calumet	Frost 2001
12PR304	st inv.	1200	P	fcr, csd	Calumet/ Glenwood	Frost 2001
12PR305	st inv.	--	P	csd	Tolleston	Frost 2001
12PR306	st inv., test	525	MW	csd, fcr, cer	Tolleston	Frost 2001
12PR307	st inv.	--	P	csd	Tolleston	Frost 2001

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR308	st inv.	500	P	fcr, csd	Tolleston	Frost 2001
12PR309	st inv.	25	P	fcr, csd	Tolleston	Frost 2001
12PR310	st inv.	320	P	fcr, csd	Tolleston	Frost 2001
12PR311	st inv.	2390	W	fcr, csd, cer	Tolleston	Frost 2001
12PR312	st inv.	1820	W	fcr, csd, cer	Tolleston	Frost 2001
12PR313	st inv.	50	P	fcr, csd	Tolleston	Frost 2001
12PR314	st inv.	1400	ELW	fcr, csd, cer	Tolleston	Frost 2001
12PR315	st inv.	--	P	csd	Tolleston	Frost 2001
12PR316	st inv.	--	P	csd	Tolleston	Frost 2001
12PR317	st inv.	90	W	fcr, csd, cer	Tolleston	Frost 2001
12PR318	st inv.	450	P	fcr, csd	Tolleston	Frost 2001
12PR319	st inv.	--	P	fcr	Tolleston	Frost 2001
12PR320	st inv.	1800	P	fcr, csd	Tolleston	Frost 2001
12PR321	st inv.	525	W	fcr, csd, cer	Tolleston	Frost 2001
12PR322	st inv.	--	P	csd	Tolleston	Frost 2001
12PR323	st inv.	2100	W	fcr, csd, cer	Tolleston	Frost 2001
12PR324	st inv.	--	P	csd	Tolleston	Frost 2001
12PR325	st inv.	725	P	fcr, csd	Tolleston	Frost 2001
12PR326	st inv.	50	P	fcr	Tolleston	Frost 2001
12PR327	st inv.	482	P	fcr, csd	Tolleston	Frost 2001
12PR328	st inv.	--	P	csd	Tolleston	Frost 2001
12PR329	st inv.	250	P	fcr	Tolleston	Frost 2001
12PR330	st inv.	750	P	fcr, csd	Tolleston	Frost 2001
12PR331	st inv.	750	P	fcr, csd	Tolleston	Frost 2001
12PR332	st inv.	100	P	fcr, csd	Tolleston	Frost 2001
12PR333	st inv.	225	P	fcr, csd	Tolleston	Frost 2001
12PR334	st inv.	165	W	fcr, csd, cer	Tolleston	Frost 2001
12PR335	st inv.	25	P	csd	Tolleston	Frost 2001

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR336	st inv.	375	P	fcr, csd	Tolleston	Frost 2001
12PR337	st inv.	375	W	fcr, csd, cer	Tolleston	Frost 2001
12PR338	st inv.	--	P	csd	Calumet	Frost 2001
12PR339	st inv.	1740	P	fcr, csd	Glenwood	Frost 2001
12PR340	st inv.	--	P	csd	Glenwood	Frost 2001
12PR341	st inv.	200	W	fcr, csd, cer	Glenwood	Frost 2001
12PR342	recon; st inv.	2100	W	fcr, csd, cer	Glenwood	Frost 2001
12PR343	st inv.	--	P	csd	Glenwood	Frost 2001
12PR344	st inv.	150	W	fcr, csd, cer	Calumet/ Glenwood	Frost 2001
12PR345	st inv.	400	W	fcr, cer	Calumet/ Glenwood	Frost 2001
12PR346	st inv.	500	P	fcr, csd	Glenwood	Frost 2001
12PR347	st inv.	690	P	fcr, csd	Glenwood	Frost 2001
12PR348	st inv.	--	P	fcr	Glenwood	Frost 2001
12PR349	st inv.	500	P	fcr, csd	Glenwood	Frost 2001
12PR350	st inv.	250	P	fcr, csd	Glenwood	Frost 2001
12PR351	st inv.	100	P; H	fcr, hist	Calumet/ Glenwood	Frost 2001
12PR352	st inv.	150	P	fcr, csd	Tolleston	Frost 2001
12PR353	st inv.	1700	P; H	fcr, csd, hist	Calumet/ Glenwood	Frost 2001
12PR354	st inv.	200	P; H	fcr, csd, hist	Calumet	Frost 2001
12PR355	st inv.	350	P	fcr, csd	Glenwood	Frost 2001
12PR356	st inv.	--	P	csd	Glenwood	Frost 2001
12PR357	st inv.	--	P	csd	Glenwood	Frost 2001
12PR358	st inv.	--	P	csd	Glenwood	Frost 2001

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR359	st inv.	--	P	fcr	Glenwood	Frost 2001
12PR360	st inv.	--	MA; H	ppt, hist	Calumet	Frost 2001
12PR361	recon; st inv.	--	LA	ppt, csd	Calumet	Frost 2001
12PR362	st inv.; test	300	LMW	ppt, fcr, csd	Calumet	Frost 2001
12PR363	st inv.	300	LA	ppt, fcr	Calumet	Frost 2001
12PR364	st inv.	15	P	fcr	Glenwood	Frost 2001
12PR365	st inv.	15	P	fcr, csd	Calumet	Frost 2001
12PR366	st inv.	--	P	csd	Calumet	Frost 2001
12PR367	st inv.	--	P	csd	Calumet	Frost 2001
12PR368	st inv.	100	P	fcr	Calumet	Frost 2001
12PR369	st inv.	300	P	fcr, csd	Calumet	Frost 2001
12PR370	st inv.	640	P	fcr, csd	Calumet	Frost 2001
12PR371	st inv.	300	P	fcr, csd	Calumet	Frost 2001
12PR372	st inv.	--	P	csd	Calumet	Frost 2001
12PR373	st inv.	--	P	fcr	Calumet	Frost 2001
12PR374	st inv.	--	P	fcr	Calumet	Frost 2001
12PR375	st inv.	50	P	fcr	Calumet	Frost 2001
12PR376	st inv.	25	P	csd	Calumet	Frost 2001
12PR377	st inv.	--	P; H	fcr, hist	Calumet	Frost 2001
12PR378	st inv.	50	P	fcr	Calumet	Frost 2001
12PR379	recon	--	P	csd	Calumet	Frost 2001
12PR380	st inv.	--	P	csd	Calumet	Frost 2001
12PR381	st inv.	75	P	csd	Calumet	Frost 2001
12PR382	st inv.	25	P	csd	Calumet	Frost 2001
12PR383	st inv.	50	P	csd	Calumet	Frost 2001
12PR384	st inv.	25	P	csd	Calumet	Frost 2001
12PR385	st inv.	--	P	fcr	Calumet	Frost 2001
12PR386	st inv.	2500	P	fcr, csd	Glenwood	Frost 2001

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR387	recon, st inv.	--	P	csd	Calumet	Frost 2001
12PR388	recon	--	P	csd	Glenwood	Frost 2001
12PR389	st inv.	--	P; H	fcr, csd, hist	Glenwood	Frost 2001
12PR390	st inv.	2000	H	hist	Calumet	Frost 2001
12PR392	st inv.	600	P	fcr, csd	Tolleston	Frost 2001
12PR393	st inv.	--	P	csd	Tolleston	Frost 2001
12PR394	st inv.; test	4250	MW	fcr, csd, cer	Tolleston	Frost 2001
12PR397	st inv.	50	P	fcr, csd	Tolleston	Frost 2001
12PR398	st inv.	--	P	csd	Tolleston	Frost 2001
12PR399	st inv.	--	P	csd	Tolleston	Frost 2001
12PR400	st inv.	75	P	fcr, csd	Tolleston	Frost 2001
12PR401	st inv.	--	P	csd	Tolleston	Frost 2001
12PR402	st inv.	--	P	csd	Tolleston	Frost 2001
12PR403	st inv.	450	P; H	fcr, csd, hist	Tolleston	Frost 2001
12PR406	st inv.	75	P	fcr, csd	Tolleston	Frost 2001
12PR407	st inv.	--	P	fcr	Tolleston	Frost 2001
12PR408	st inv.	70	P	fcr	Tolleston	Frost 2001
12PR409	st inv.	30	P	csd	Calumet	Frost 2001
12PR410	st inv.	--	P	csd	Calumet	Frost 2001
12PR412	st inv.	--	P	csd	Tolleston	Frost 2001
12PR413	st inv.	--	P	csd	Tolleston	Frost 2001
12PR414	st inv.	100	P	fcr	Calumet	Frost 2001
12PR415	st inv.	50	P	csd	Calumet	Frost 2001
12PR416	st inv.	50	P	fcr, csd	Calumet	Frost 2001
12PR417	st inv.	15	P	fcr, csd	Calumet	Frost 2001
12PR418	st inv.	300	P	fcr, csd	Calumet	Frost 2001

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR419	st inv.	4600	W; H	ppts, fcr, csd, cer, hist	Calumet	Frost 2001
12PR420	st inv.	15	P	csd	Calumet	Frost 2001
12PR421	st inv., surface inv.	100	P	fcr, csd	Calumet	Frost 2001
12PR422	st inv.	--	P	fcr, csd	Glenwood	Frost 2001
12PR423	st inv.	2600	W; H	fcr, csd, cer, hist	Calumet	Frost 2001
12PR424	st inv.	70	P; H	fcr, csd, hist	Calumet	Frost 2001
12PR425	st inv.	15	P	csd	Calumet	Frost 2001
12PR426	st inv.	15	P	fcr, csd	Calumet	Frost 2001
12PR427	st inv.	2800	W; H	fcr, csd, cer, hist	Calumet	Frost 2001
12PR428	st inv.	6000	W	ppt, fcr, csd, cer	Calumet	Frost 2001
12PR429	st inv.	1250	P	fcr, csd	Glenwood	Frost 2001
12PR430	st inv.	300	P	fcr, csd	Glenwood	Frost 2001
12PR431	st inv.	175	P	fcr	Glenwood	Frost 2001
12PR432	st inv.	250	P	fcr, csd	Glenwood	Frost 2001
12PR433	st inv.	100	W	csd, cer	Calumet	Frost 2001
12PR434	st inv.	--	P	fcr	Glenwood	Frost 2001
12PR435	st inv.	425	P	fcr, csd	Glenwood	Frost 2001
12PR436	st inv.	--	P	csd	Glenwood	Frost 2001
12PR437	st inv.	--	P	fcr	Glenwood	Frost 2001
12PR438	st inv.	3000	P	fcr, csd	Glenwood	Frost 2001
12PR439	st inv.	375	P	fcr, csd	Glenwood	Frost 2001
12PR440	st inv.	50	P	fcr	Glenwood	Frost 2001

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR441	st inv.	75	P	fcr, csd	Little Calumet River	Frost 2001
12PR442	st inv.	--	P	fcr	Little Calumet River	Frost 2001
12PR443	st inv.	35	P	fcr, csd	Little Calumet River	Frost 2001
12PR444	st inv.	7700	P	fcr, csd	Little Calumet River	Frost 2001
12PR445	recon	--	P	csd	Lake Border Moraine	Frost 2001
12PR446	st inv.	--	P; H	csd, hist	Lake Border Moraine/ Glenwood interface	Frost 2001
12PR447	recon; st inv.	--	P	csd	Calumet	Frost 2001
12PR448	recon; st inv.	--	P	fcr, csd	Calumet	Frost 2001
12PR449	recon; st inv.	--	P	fcr, csd	Calumet	Frost 2001
12PR495	recon; st inv.	--	P	fcr, csd	Calumet	Frost 2001
12PR496	recon; st inv.	--	W	fcr, csd, cer	Tolleston	Frost 2001
12PR497	recon; st inv.	--	LW	ppt, fcr, csd	Tolleston	Frost 2001
12PR498	st inv.	6500	MW; LW; H	ppts, fcr, csd, cer, hist	Calumet/ Glenwood	Frost 2001
12PR499	st inv.	2000	W	fcr, csd, cer	Calumet/ Glenwood	Frost 2001

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR500	st inv.	--	P	csd	Calumet	Frost 2001
12PR501	recon, st inv.	--	P	fcr	Calumet	Frost 2001
12PR502	st inv.	400	P	fcr, csd	Tolleston	Frost 2001
12PR503	st inv.	50	P	fcr, csd	Calumet	Frost 2001
12PR504	st inv.	50	P	fcr, csd	Calumet	Frost 2001
12PR505	surface inv.	--	LPI/EA; LMW	ppts, fcr, csd	Lake Border Moraine	Frost 2001; Stadler 2001c
12PR506	st inv.	1000	W	fcr, csd, cer	Calumet/ Glenwood	Frost 2001
12PR507	st inv.	--	P	csd	Lake Border Moraine	Frost 2001
12PR508	st inv.	--	P	csd	Lake Border Moraine	Frost 2001
12PR509	st inv.	--	EA	ppt, csd	Lake Border Moraine	Frost 2001
12PR510	st inv.	--	P; H	csd, hist	Little Calumet River	Frost 2001
12PR511	st inv.	--	P	csd	Little Calumet River	Frost 2001
12PR512	st inv.; test	--	P	csd	Calumet	Frost 1996
12PR513	st inv.; testing	--	P	csd	Lake Border Moraine	Stadler 2002b; Sturdevant 2004c; Sturdevant and Bringelson 2003
12PR514	st inv.	--	P	cst, fcr	Calumet lacustrine plain	state site form (Frost 1996)
12PR515		--				state site form (Frost 1996)

Table 5. Continued

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR589	recon, st inv.	--	P	csd, fcr	Valparaiso moraine	Frost 1998
12PR590	incidental discovery	225	P	fcr, csd	Valparaiso moraine	Frost 1998
12PR591	incidental discovery	25	P	fcr	Valparaiso moraine	Frost 1998
12PR592 (12PR606)	st inv.	875	W; H	fcr, cer, csd, fauna, hist	Calumet lacustrine plain	Frost 1998; Stadler 2000
12PR593	st inv.	150	P	fcr	Calumet lacustrine plain	Frost 1998
12PR594	st inv.	--	P	csd	Calumet lacustrine plain	Frost 1998
12PR595	st inv.	--	P	csd	Calumet lacustrine plain	Frost 2001
12PR596	recon	5959	H	hist	recent dunes	Frost 1997; Ehn 2002
12PR597	test	--	EA	ppts, cst, csd, fcr, feature	Calumet	Stadler 2001
12PR598	incidental discovery; recon	--	P	csd, ppt	Tolleston	MWAC accession records
12PR603	surf inv.; test	--	P	fcr, csd, fauna	Calumet	Sturdevant and Bringelson n.d.
12PR604	st inv.	300	P	csd	Calumet lacustrine plain	Jones 1997

Table 5. Concluded

Site Number	Mode of Investigation	Site Size (m2)	CH Designation	Artifact Classes	Landform System	Reference
12PR605	st inv.	--	P	csd	Calumet	Jones 1997
12PR607	st inv.	--	P	csd	Calumet	Stadler 2000
12PR608	st inv.; test	600	LA	ppt, csd, fcr	Calumet	Stadler 2001a, 2002a
12PR609	st inv.	--	P	csd	Calumet	Stadler 2001c
12PR610	st inv.	--	P	csd	Calumet	Stadler 2001c; Sturdevant and Bringelson n.d.
12PR611	st inv.	2000	P	csd	Calumet	Stadler 2001c; Sturdevant 2004a
12PR612	st inv.	600	P; H	csd, fcr, hist	Calumet	Stadler 2001c
12PR631	st inv.	1000	P, H	fcr, csd, hist	Glenwood	Sturdevant 2004b
12PR632	st inv., test	13200	A; LW	csd, fcr, cer, ppts, cst	Calumet	Sturdevant and Bringelson n.d.
12PR633	recon, st inv., test	--	P; H	csd, hist	Lake Border Moraine	Sturdevant 2004d
12PR634	st inv.	150	P	csd, fcr	Calumet	Sturdevant 2004a; Sturdevant and Bringelson n.d.
12PR635	st inv.	--	P	csd	Calumet	Sturdevant 2004c
12PR636	st inv.	225	LA; H	csd, fcr, ppt, hist	Calumet	Sturdevant 2005b
12PR637	st inv.	25	P	csd, fcr	Calumet	Sturdevant 2004c
1993-13	st inv.	--	P	fcr, csd	no data	Frost 2001

Explanation:

Site Number
State (Smithsonian) site numbers are provided when available. The Bailly Homestead and Cemetery is identified by its ASMIS number here, and the final site (1993-13) is identified by its field number.

Mode of Investigation
Mode of investigation corresponds with "work type" in Table 4, and is explained in the text. It refers to the means used to investigate each resource; different modes of investigation vary widely in level of resulting detail.

Modes of investigation given here, roughly in order from least to most intensive techniques, are: incidental discovery; recon (reconnaissance); st inv. (shovel-test inventory); surface inv. (surface inventory, or surface collection); test (testing); stripped pz (stripped plowzone); and data rec.(data recovery).

Site Size (m2)
Site size is given in square meters, based on information provided in the reference cited.

Abbreviations used for Culture-historic designation
Culture-historic periods:
H: Historic; P: general prehistoric; W: Woodland; A: Archaic; UM: Upper Mississippian; PI: Paleo-Indian
Modifiers for culture-historic periods:
E: early; M: middle; L: late
(for example, EA=Early Archaic; LMW=late Middle Woodland).

Artifact classes noted in site documentation are listed here. Abbreviations used include: hist (historic items), csd (chipped stone debris), ppt or ppts (projectile point[s]), fcr (fire-cracked rock), macrobot (macrobotanical remains, e.g., wood charcoal, charred seeds), and cer (ceramic sherds).

Table 6. Specific precontact site components: period by general landform (see Figure 5).

	Glenwood	Calumet	Tolleston	Moraine uplands	Lake plain	Recent dunes	Total
Early Precontact (LPA-EA)	0	3	0	2	0	0	5
Middle Precontact (MA-EW)	0	9	0	0	0	0	9
Later Precontact (MW-LW)	2	26	13	1	2	0	44
Total	2	38	13	3	2	0	58

Table 7. All site components: level of culture-historical detail by general landform.

	Glenwood	Calumet	Tolleston	Moraine Uplands	Lake plain	Recent dunes	Total
General Precontact	33	74	41	11	13	2	174
Specific Precontact	2	38	13	3	2	0	58
Historic	2	19	1	3	2	1	28
Total	37	131	55	17	17	3	260

Table 8. All site components: general landform by most intensive investigation.

	Excavation	Inventory	Reconnaissance	Total
Glenwood	0	36	1	37
Calumet	25	94	12	131
Tolleston	2	52	1	55
Moraine uplands	3	11	3	17
Lake plain	0	17	0	17
Recent dunes	0	2	1	3
Total	30	212	18	260

Table 9. All site components: level of culture-historical detail by most intensive investigation.

	Excavation	**Inventory**	**Reconnaissance**	**Total**
General precontact	6	154	14	174
Specific precontact	21	36	1	58
Historic	3	22	3	28
Total	30	212	18	260

Explanation:

Culture historical periods are collapsed in Table 7 to increase sample sizes of earlier groups, for analytical purposes.

“Site component,” the unit of measure in all above tables, is not equal to “site.” Many sites consist of single components, but others contain two or more.

“Excavation,” as used here, refers to all digging with controlled volume, or all projects using square holes and control over depth below surface. This includes both testing and data recovery. “Inventory” refers to shovel-test inventory, and controlled surface inventory. “Reconnaissance” refers to preliminary, low-intensity studies involving landscape-level observations and non-systematic searches for cultural materials.

Table 10. Regional archeological responses: INDU ceramic sample identification.

Object ID	Analyst 1	Analyst 2	Analyst 3	Analyst 4
8541	ELW/LLW	UM - Moccasin Bluff Notched Applique	ELW - Early Albee	LW - West Coast Michigan types
10132	MW - Havana Cordmarked	??	No Comment	MW - Havana
PR 394_901_004	MW	Sumerville/Hopewell - A.D. 350	No Comment	MW - Hopewellian? similar to Havana styles
10679	ELW/LLW	LW?	No Comment	LW?
10926	EL/LLW	UM - Moccasin Bluff Notched Applique	Early Albee	LLW - Moccasin Bluff Notched/Filleted or Modified Lip
10928	ELW/LLW	LW?	No Comment	LW - Moccasin Bluff Plain?
PR 394_401_004	MW	UM - Moccasin Bluff Collared	LLW - Undefined (derived) from Albee	LW - Moccasin Bluff Collared
10912	LMW/LW - Transitional	UM - Moccasin Bluff Modified Lip	No Comment	No Comment
10929	ELW/LLW	MW	No Comment	LW - Moccasin Bluff Plain
PR_298 Vessel 2	LEW/EMW	LMW/ELW boundary	ELW - Walkerton (IN) or Weaver (IL)	EW/EMW
PR_303_404_002	ELW/LLW - Albee	UM - Moccasin Bluff Collared	No Comment	LW - Diefenderfer 1100-1300 intrusive?
PR_314_406_001	No Comment	ELW - Allegan	No Comment	ELW -?
Vessel 1	ELW/LLW - Albee	UM - Moccasin Bluff Collared	No Comment	No Comment
10883	MW - Havana Cordmarked	ELW - Allegan	No Comment	LW - Unknown collared

Explanation:

LW: Late Woodland
MW Middle Woodland
EW: Early Woodland
ELW: early Late Woodland
EMW:early Middle Woodland
UM: Upper Mississippian
LLW: late Late Woodland
LMW: late Middle Woodland

APPENDIX 1: LATE WOODLAND POTTERY TYPOLOGIES SURROUNDING LAKE MICHIGAN

Jay T. Sturdevant

This appendix was created using text and illustrated type descriptions provided by authors of the publications cited below. A standardized list of traits was developed to be broadly applicable and best represent the defining attributes of each type. In some cases, the original type descriptions did not include information for the specific traits listed below. Traits listed as “Not described” were not mentioned by the original authors.

This list constitutes most of the Late Woodland pottery types defined for the Lake Michigan area and serves as a quick reference guide for these types. It is not intended to redefine or modify existing typologies. Any errors in transcription from the original publications are the sole responsibility of this author.

Southwest Michigan

Moccasin Bluff Wares (Bettarel and Smith 1973; McCallister 1980)

Moccasin Bluff Cordmarked

Method of Manufacture: Not described
Paste and Temper: Uniform sandy paste with small to large pieces of grit temper.
Color: Reddish brown, yellowish brown, pale brown
Surface Treatment: Cordmarked exterior surface and smooth interior surface
Decoration: None
Vessel Shape: Globular
Rim Form: Straight or constricted neck
Lip Form: Several groupings within the Moccasin Bluff Cordmarked type were defined by Bettarel and Smith (1973:53-56) based on variations in lip form. These include

1. square flattened and cordmarked lip
2. protruding exterior rim
3. beveled lip
4. lip squared and plain
5. small collar (near exterior edge of the lip)

Chronological Range: Late Woodland
Geographic Area: Southwestern Michigan
Related Taxonomic Unit: Brems Phase

Moccasin Bluff Collared

Method of Manufacture: Not described
Paste and Temper: Uniform sandy paste with small to large pieces of grit temper.
Color: Reddish brown, pale brown, gray brown
Surface Treatment: Cordmarked
Decoration: Sometimes impressed castellations
Vessel Shape: Conical to globular

Rim Form: Collared - straight to slightly excurvate
Lip Form: See Moccasin Bluff Cordmarked
Chronological Range: Early Late Woodland
Geographic Area: Southwestern Michigan
Related Taxonomic Unit: Brems Phase

Moccasin Bluff Modified Lip

Method of Manufacture: Not described
Paste and Temper: Uniform sandy paste with small to large pieces of grit temper.
Color: Variations on brown reddish brown, yellowish brown, gray brown, pale brown
Surface Treatment: Cordmarked
Decoration: Several decorative groups that extend from exterior lip to top of lip, described by Bettarel and Smith (1973:56-57)

1. Cord wrapped stick impressions
2. Paddle-edge impressed:
3. Finger-nail impressed:
4. Lunate impressed:
5. Lip-thickened and notched:
6. Punctates on the exterior edge of the lip

Vessel Shape: Not described
Rim Form: Straight to slightly excurvate - with decorative group 5 having slightly thickened lip area
Lip Form: Not described
Chronological Range: Early Late Woodland
Geographic Area: Southwestern Michigan
Related Taxonomic Unit: Brems Phase

Moccasin Bluff Impressed Exterior Lip

Method of Manufacture: Not described
Paste and Temper: This type was divided into two groupings based on paste characteristics.

1. Uniform sandy paste with small to large pieces of grit temper.
2. Smooth or wax-like surface texture and temper made up of crushed rock, sand, and some shell.

Color: Group 1 includes reddish browns, yellowish browns, pale brown, and gray browns – grays and gray browns are the most common (Bettarel and Smith 1973:61), Group 2 color is very dark gray to black (Betteral and Smith 1973:62)
Surface Treatment: Mixed and variable cordmarking, sometimes light and smoothed over
Decoration: Impressions confined to the exterior lip that vary between long and narrow, circular, or impressions made with the side of a finger. Some vessels have holes drilled just below the rim and others have trailed impressions over the cormarked surface onto the shoulder of the vessel. A few lug handles are also present.
Vessel Shape: Conical to globular
Rim Form: Straight to excurved and examples of outflaring within Group 2 (smooth paste)
Lip Form: Group 1 flattened and squarish, sometimes slightly rounded; Group 2 – usually rounded but sometimes flattened and squarish
Chronological Range: Late Late Woodland/Upper Mississippian

Geographic Area: Southwest Michigan
Related Taxonomic Unit: Moccasin Bluff Phase

Moccasin Bluff Plain

Method of Manufacture: Not described
Paste and Temper: Uniform sandy paste with small to medium pieces of grit temper.
Color: Pale brown, reddish yellow, and brownish yellow
Surface Treatment: None
Decoration: None
Vessel Shape: Conical to semi-globular
Rim Form: Straight to excurvate
Lip Form: squared, rounded, rounded and thinned
Chronological Range: Late Late Woodland/Upper Mississippian
Geographic Area: Southwest Michigan
Related Taxonomic Unit: Moccasin Bluff Phase

Moccasin Bluff Notched Applique Strip

Method of Manufacture: Not described
Paste and Temper: Uniform sandy paste with small to medium pieces of grit temper.
Color: Grays, browns, and pale browns the predominant colors
Surface Treatment: Usually plain but sometimes exhibits smoothed over or mixed cordmarking beginning at the shoulder and extending to the base of the vessel
Decoration: Diagonal impressions encircling the vessel just below the lip either on the exterior of the vessel wall or placed into a narrow appliqué strip
Vessel Shape: Semi-globular
Rim Form: Outsloping and excurvate
Lip Form: Flattened and squarish
Chronological Range: Late Late Woodland/Upper Mississippian
Geographic Area: Southwestern Michigan
Related Taxonomic Unit: Moccasin Bluff Phase

Moccasin Bluff Scalloped

Method of Manufacture: Not described
Paste and Temper: Uniform sandy paste with small to medium pieces of grit temper.
Color: dark gray to grayish brown
Surface Treatment: Smoothed, partially smoothed, or cordmarked
Decoration: Scalloped impressions on the top of the lip, formed with thumb or finger for a continuous pie crust effect
Vessel Shape: Conical to semi-globular
Rim Form: Slightly excurving
Lip Form: Rounded or flattened plain smooth lip
Chronological Range: Late Late Woodland/Upper Mississippian
Geographic Area: Southwest Michigan
Related Taxonomic Unit: Moccasin Bluff Phase

INDIANA DUNES NATIONAL LAKESHORE

Allegan Ware (Rogers 1972: Kingsley 1977; Kingsley and Garland 1980)

Allegan Undecorated Cordmarked

Method of Manufacture: Coiling
Paste and Temper: Poorly compacted paste; grit temper (sherds coarse and crumbly – interior and exterior spalls common)
Color: Yellowish brown to reddish brown
Surface Treatment: Cordmarked or smoothed-over cordmarked
Decoration: None
Vessel Shape: Globular
Rim Form: No castellations or collars; rims are straight or slightly everted occasional pronounced eversion
Lip Form: Several varieties have been developed based on rim form (Kingsley 1977:168)

1. Flat Lip: Flat lip with cordmarked or smooth surface
2. Round Lip: surfaces are cordmarked or smooth
3. Beveled Lip: Lip flattened at angle sloping outward from rim; cordmarked
4. Thickened Lip: Outer edge of lip thickened using cordwrapped paddle
5. Aberrant Lip: Pointed and anomalous lips

Chronological Range: Late Woodland – A.D. 600 to 1400

1. Early Allegan Phase - A.D. 600-900: Beveled lip, flat lip, and round lip variants
2. Late Allegan Phase - A.D. 900-1400: Thickened lip variant

Geographic Area: Southwestern Michigan
Related Taxonomic Unit: Allegan Tradition (comparable to Moccasin Bluff cordmarked to the south and Wayne wares in southeast Michigan), Allegan Phase

Allegan Undecorated Smoothed

Method of Manufacture: Coiling
Paste and Temper: Poorly compacted paste; grit temper (sherds coarse and crumbly – interior and exterior spalls common)
Color: Yellowish brown to reddish brown
Surface Treatment: Smoothed
Decoration: None
Vessel Shape: Globular
Rim Form: Straight
Lip Form: Flat or round
Chronological Range: Late Woodland - A.D. 600 - 1400

1. Early to Late Allegan Phases

Geographic Area: Southwest Michigan: Kalamazoo River Valley
Related Taxonomic Unit: Allegan Tradition, Allegan Phase

Allegan Undecorated Fabric Impressed

Method of Manufacture: Coiling
Paste and Temper: Poorly compacted paste; grit temper (sherds coarse and crumbly – interior and exterior spalls common)
Color: Yellowish brown to reddish brown

Surface Treatment: Impressed with woven fabric
Decoration: None
Vessel Shape: Globular
Rim Form: Straight to slightly everted
Lip Form: Flat with fabric impressions
Chronological Range: Early Late Woodland A.D. 600 - 900
1. Early Allegan Phase
Geographic Area: Southwestern Michigan; Kalamazoo River Valley
Related Taxonomic Unit: Allegan Tradition, Allegan Phase

Allegan Undecorated Collared (Kingsley and Garland 1980:9-10)

Method of Manufacture: Coiling
Paste and Temper: Poorly compacted paste; grit temper (sherds coarse and crumbly – interior and exterior spalls common)
Color: Yellowish brown to reddish brown
Surface Treatment: two variants defined based on surface treatment
1. Cordmarked – exterior
2. Fabric impressed - exterior

Decoration: None
Vessel Shape: Globular
Rim Form: Collared: straight
Lip Form: Not described
Chronological Range: Late Late Woodland
1. Late Allegan Phase

Geographic Area: Southwest Michigan: Kalamazoo River Valley
Related Taxonomic Unit: Allegan Tradition, Allegan Phase

Allegan Decorated Collared (Kingsley and Garland 1980:10-11)

Method of Manufacture: Coiling
Paste and Temper: Poorly compacted paste; grit temper (sherds coarse and crumbly – interior and exterior spalls common)
Color: Yellowish brown to reddish brown
Surface Treatment: Cordmarked
Decoration: At least two variants based on decoration
1. Punctate: Circular punctuations created with round ended tool
2. Corded punctuate:

Vessel Shape: Globular
Rim Form: Collared: straight
Lip Form: Not described
Chronological Range: Late Late Woodland
2. Late Allegan Phase

Geographic Area: Southwest Michigan: Kalamazoo River Valley
Related Taxonomic Unit: Allegan Tradition, Allegan Phase

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Allegan Decorated Lip

Method of Manufacture: Coiling
Paste and Temper: Poorly compacted paste; grit temper (sherds coarse and crumbly – interior and exterior spalls common)
Color: Yellowish brown to reddish brown
Surface Treatment: Cordmarked or smoothed-over cordmarked
Decoration: Lip decorations include cord wrapped tool impressed
Vessel Shape: Globular
Rim Form: Straight to slightly everted
Lip Form: Flat, rounded, beveled, thickened, pointed
Chronological Range: Early Late Woodland: A.D. 600 - 900
Geographic Area: Southwest Michigan; Kalamazoo River Valley
Related Taxonomic Unit: Allegan Tradition; similar to lip decorated types at Moccasin Bluff site

Allegan Decorated

Method of Manufacture: Coiling
Paste and Temper: Poorly compacted paste; grit temper (sherds coarse and crumbly – interior and exterior spalls common)
Color: Yellowish brown to reddish brown
Surface Treatment: Vertical cordmarking or smoothed; interior smoothed
Decoration: Variants defined based on decorative elements (Kingsley 1977:172 – 173)

1. Allegan Punctate: Round hollow in a single row; cord wrapped tool impressions can occur on lip
2. Corded-punctate: Corded-tool punctuations in one to three rows; cord wrapped tool impressions can occur on the lip
3. Allegan Linear Cord-impressed: One to three rows of horizontal cord impressions present over cordmarked surface
4. Allegan Rocker-stamped: Plain rocker-stamping over a smooth surface
5. Allegan Zoned Rocker-stamped: Plain rocker-stamping over a smooth surface; rocker-stamped surfaces separated from smooth surfaces with incised lines
6. Allegan Incised: Horizontal, vertical, and non-patterned

Vessel Shape: Globular
Rim Form: Straight
Lip Form: Flat, round, pointed
Chronological Range: Late Woodland: A.D. 600 – 1400

1. Early Allegan Phase: A.D. 600-900: Incised, Linear Cord-impressed
2. Late Allegan Phase: A.D. 900-1400: Incised, linear cord-impressed, punctuate varieties may be restricted to Late Allegan Phase
3. Rocker stamped and zoned rocker-stamped varieties are likely Late Middle Woodland types

Geographic Area: Southwest Michigan: Kalamazoo River Valley
Related Taxonomic Unit: Allegan Tradition, Allegan Phase

Hacklander Ware (Kingsley 1977)

Hacklander Undecorated

Method of Manufacture: Paddle and Anvil
Paste and Temper: Sandy clay paste, well compacted; grit temper
Color: Not described
Surface Treatment: Several variants were described by Kingsley (1977:175)

1. Striated: Striated exterior, horizontal, vertical, oblique; lip decorated with dentate impressed and cord-wrapped stick impressed
2. Smoothed: Smoothed interiors and exteriors; dentate tool impressed lips occur
3. Cordmarked: Vertical cordmarked exteriors; dentate tool impressed lips occur

Decoration: Some lip decoration on above variants
Vessel Shape: Globular
Rim Form: Straight or slightly everted
Lip Form: Flat, round, or thickened
Chronological Range: Late Woodland
Geographic Area: Southwest Michigan: Kalamazoo River Valley
Related Taxonomic Unit: Not described

Hacklander Decorated

Method of Manufacture: Paddle and Anvil
Paste and Temper: Sandy clay paste, well compacted; grit temper
Color: Not described
Surface Treatment:

1. Interior: Horizontally striated or smoothed
2. Exterior: Striated – oblique or horizontal, vertical cordmarking, smoothed

Decoration: Several variants defined by Kingsley (1977:176-177)

1. Rocker Dentate: Vertical or horizontal dentate stamping over smoothed or horizontally striated surface; appliqué neck or shoulder strips – strips are dentate stamped oblique; rows of round punctuates occur; lips are undecorated, dentate impressed oblique, or knot impressed
2. Punctate: Row of rounded punctuations between lip and neck, lip is dentate impressed oblique
3. Cordmarked Applique: Vertically cordmarked with appliqué neck strip
4. Corded Punctate: Vertically cordmarked with cordwrapped stick punctuates
5. Cordwrapped Paddle-edge Stamped: paddle edge stamped horizontal; punctuates can be present
6. Cross-hatched: Vertically cordmarked with fine line diamond incising on upper rim and shoulder; lip is cordwrapped paddle edge impressed

Vessel Shape: Globular
Rim Form: Straight or slightly everted (constriction at neck)
Lip Form: Flat, round, thickened
Chronological Range: Late Woodland
Geographic Area: Southwest Michigan: Kalamazoo River Valley
Related Taxonomic Unit: Not described

INDIANA DUNES NATIONAL LAKESHORE

Western Michigan

Spring Creek Wares (Fitting 1968)

Spring Creek Collared

Method of Manufacture: Coiled and smoothed
Paste and Temper: Grit (crushed granite) temper with relatively uniform paste, some sand
Color: Dark brown, brown, and yellowish brown
Surface Treatment: Cordmarked, smoothed-over cordmarked, smoothed, textile impressed (small percentage)
Decoration: Paddle edge, cord wrapped stick impressed
Vessel Shape: Globular
Rim Form: Usually straight with some slightly excurvate
Lip Form: Flattened to rounded
Chronological Range: Early Late Woodland – A.D. 900
Geographic Area: Central Western Michigan
Related Taxonomic Unit: Not described

Spring Creek Thickened

Method of Manufacture: Coiled and scraped
Paste and Temper: Grit tempered with relatively uniform paste with some sand
Color: Dark brown, brown, and yellowish brown
Surface Treatment: Cordmarked
Decoration: See above
Vessel Shape: See above
Rim Form Straight to slightly excurvate*:*
Lip Form: Pinched or flattened
Chronological Range: See above
Geographic Area: See above
Related Taxonomic Unit: Not described

Spring Creek Plain or Rounded Rim

Method of Manufacture: See above
Paste and Temper: See above
Color: See above
Surface Treatment: See above
Decoration: See above
Vessel Shape: See above
Rim Form*:* Straight to slightly excurvate
Lip Form: Squared to pointed
Chronological Range: See above
Geographic Area: See above
Related Taxonomic Unit: Not described

Southeastern Michigan

Wayne Ware (Fitting 1965)

Wayne Cordmarked

Method of Manufacture: Not described
Paste and Temper: Sand and grit
Color: Gray-buff to gray
Surface Treatment: Cordmarked and smoothed-over cordmarked
Decoration*:* Several variants of decotative techniques are described by Fitting (1965:158)

1. Wayne Cordmarked: Cordmarking up to the lip
2. Wayne Smoothed: Smoothed over cordmarking on the rim and upper body
3. Wayne Punctate: Cord wrapped paddle impressions have been altered by punctuation with a plain tool with a rounded or wedge-shaped tip
4. Wayne Corded Punctate: Cord-wrapped stick used to make punctuates
5. Wayne Cord Impressed: Plain cordmarked neck is impressed with a single cord
6. Wayne Crosshatched: Rim decorated with criss-cross incisions

Vessel Shape: Globular to slightly elongated (semi-globular)
Rim Form: Uncollareded, no castellations, thickening rare, some slight “pseudo” collar on some forms; rims are straight to outflaring
Lip Form: Usually rounded with some thickened and outsloping lips
Chronological Range: Late Woodland -
Geographic Area: Southeastern Michigan
Related Taxonomic Unit: Younge Tradition

Central Indiana (Kankakee and Wabash Drainages)

Albee Wares (Winters 1967); see also Faulkner (1972) and McCord and Cochran (2003)

Albee Cordmarked

Method of Manufacture: Not described
Paste and Temper: Fine to coarse paste mixed with grit and sand
Color: Gray to black, rarely buff; cores buff to gray
Surface Treatment: Closely spaced cordmarking covering the entire exterior surface of the vessel and occasionally the lip
Decoration: Several decorative treatments have been described for this type

1. Plain stick impressed – lip interior, vertical or diagonal
2. Cordwrapped stick impressed – lip interior, vertical or diagonal
3. Cylindrical Punctates - exterior
4. Vertical incisions - exterior
5. Diagonal incisons - exterior
6. Cross-hatched lines - exterior
7. Knot impressions – exterior

Vessel Shape: Slightly elongated or globular jars
Rim Form: Collared, uncollared, or sometimes castellated rims; moderate constriction and eversion

Lip Form: Flat or rounded
Chronological Range: Late Woodland –
Geographic Area: Central Indiana and Illinois
Related Taxonomic Unit: Albee Phase

Eastern Wisconsin

Madison Wares (Baerreis and Freeman 1958; Mason 1981:304-308)

Madison Cordmarked

Method of Manufacture: Not described
Paste and Temper: Not described
Color: Not described
Surface Treatment: Cordmarked
Decoration: Not described
Vessel Shape: Globular
Rim Form: No collars
Lip Form: Not described
Chronological Range: Late Woodland A.D. 650 – 1200
Geographic Area: Southeast Wisconsin
Related Taxonomic Unit: Effigy Mound Tradition: Horicon Phase

Aztalan Collared

Method of Manufacture: Not described
Paste and Temper: Grit
Color: Not described
Surface Treatment: Cordmarking
Decoration: Cord wrapped stick impressions, smooth notches, and punctuates usually located on the collar or lip area
Vessel Shape: Globular
Rim Form: This type was divided into four varieties based on rim characteristics (Baerreis and Freeman 1958:40) – all rims are straight or slightly excurvate

1. Outer collar face which is concave and increases in thickness toward its base
2. 2. Outer collar face is straight or convex and expands in thickness from lip to base of the collar
3. Collar of unifom thickness with outer surface straight or slightly convex
4. Similar to Variety 1 but has a lip that is thinned, tapered, and has an outward curvature

Lip Form: Square and flat or rounded
Chronological Range: Late Woodland: A.D. 800 – 1300
Geographic Area: Southeast Wisconsin
Related Taxonomic Unit: Effigy Mound Tradition: Kekoskee Phase

Point Sauble Collared

<u>Method of Manufacture:</u> Coiling
<u>Paste and Temper:</u> Coarse grit
<u>Color:</u> Gray, black, or reddish
<u>Surface Treatment:</u> Cordmarked or fabric impressed
<u>Decoration:</u> Several decorative types have been identified

1. Cord impressed exterior rim – parallel diagonal impressions on rim below collar and extending to shoulder
2. Cord wrapped stick impressed – horizontal row of parallel impressions are found below the diagonal cord impressions
3. Collars are always covered with horizontal, vertical, or a combination of diagonal and horizontal cord impressed lines
4. Cord impressed interior rims – diagonal or vertical impressions
5. Smooth notches

<u>Vessel Shape:</u> Globular
<u>Rim Form:</u> Collars present
<u>Lip Form:</u> Rounded or pointed
<u>Chronological Range:</u> Late Woodland: A.D. 800 – 1300
<u>Geographic Area:</u> Southeast Wisconsin
<u>Related Taxonomic Unit:</u> Effigy Mound Tradition: Kekoskee Phase

Northeast Illinois and Southern Wisconsin

Starved Rock Wares (Hall 1987); see also Faulkner (1972)

Starved Rock Collared

<u>Method of Manufacture:</u> Paddle and Anvil
<u>Paste and Temper:</u> Medium grit
<u>Color:</u> tan or red
<u>Surface Treatment:</u> cordmarked or smoothed over cordmarked
<u>Decoration:</u> Decorations confined to inner lip or inner rim surface only (Hall 1987:65) with decorative techniques being primarily tool impressed repetitive motifs
<u>Vessel Shape:</u> Globular with well rounded shoulders
<u>Rim Form:</u> All vessels exhibit collar-like thickening and are concave on the outside with a flattened lip; some rims are cambered (Hall 1987:66)
<u>Lip Form:</u> Square and flattened
<u>Chronological Range:</u> Late Woodland – A.D. 900 to 1200
<u>Geographic Area:</u> Northern Illinois and Southern Wisconsin
<u>Related Taxonomic Unit:</u> Although Hall (1987:69) discusses similarities and relationships with Late Woodland ceramics from the Fisher Site as well as Aztalan Collared and Allbee Cordmarked types

Northern Wisconsin

Heins Creek Ware (Mason 1966)

Heins Creek Cordmarked

Method of Manufacture: Not described
Paste and Temper: Compact paste; small to large grit temper
Color: Black to buff
Surface Treatment: Cordmarked and/or smoothed-over cordmarked
Decoration: None
Vessel Shape: Not described
Rim Form: Round to pointed, or flat
Lip Form: Round, tapered, or flat
Chronological Range: Late Woodland
Geographic Area*:* Northern Wisconsin
Related Taxonomic Unit: Lakes Phase – also found with Madison, Aztalan, and Point Sauble wares at sites on the Door Peninsula

Heins Creek Corded-stamped

Method of Manufacture: Not described
Paste and Temper: Compact paste; small to large grit temper
Color: Black to buff
Surface Treatment: Cordmarked
Decoration: Corded stamping on the upper exterior and/or interior rim immediately contiguous to the lip and/or to the lip proper (dentate-like stamps); lip may be plain or impressed with corded stamp (Mason 1966:19)
Vessel Shape: large shouldered pot with slightly constricting necks and moderately flaring rims
Rim Form: Vertical to slightly everted
Lip Form: Flat and square
Chronological Range*:* Late Woodland: A.D. 400 - 700
Geographic Area*:* Northern Wisconsin
Related Taxonomic Unit: Lakes Phase – also found with Madison, Aztalan, and Point Sauble wares at sites on the Door Peninsula

Heins Creek Cord-wrapped Stick Impressed

Method of Manufacture: Unknown
Paste and Temper: Compact paste; small to large grit temper
Color: Black to buff
Surface Treatment: Cordmarked
Decoration: Multiple parallel rows running around the vessel on the lower rim or neck; this may or may not be embellished with top and/or bottom bordering punctuates or short vertical or slightly oblique stamps the latter frequently impinge on the lip; parallel rows on the neck may be alternated or bordered with chevrons or suspended triangles; lips are plain or are transversely or diagonally stamped; interior rims may be plain or may have a single or

less frequently double row of short vertical stamps (Mason 1966:204)

Vessel Shape: Large shouldered vessels with slightly constricted necks and moderately flaring rims

Rim Form: Moderately flared/everted with thickening towards the lip

Lip Form: Flat with tendency of "lipping" over the rim

Chronological Range: Late Woodland

Geographic Area: Northern Wisconsin

Related Taxonomic Unit: Lakes Phase – also found with Madison, Aztalan, and Point Sauble wares at sites on the Door Peninsula

Northern Michigan

Skeegmog Point Wares (Hambacher 1992)

Bowerman

Method of Manufacture: Not described

Paste and Temper: Silty to fine sandy paste; low amounts of grit temper

Color: Not described

Surface Treatment: Fine cordmarking on exterior surfaces oriented vertically or slightly oblique; lips are cordmarked or smooth

Decoration:

1. Cord-wrapped stick impressions or irregularly shaped punctuates at the lip
2. Single or double rows of shallow circular, rectangular, square, or wedge-shaped punctuates at base of the rim
3. Closely spaced vertical cord wrapped stick impressions on the interior lip/rim

Vessel Shape: Globular

Rim Form: Straight rims with slightly constricted or unconstricted necks

Lip Form: Flat, thickened, or rounded

Chronological Range: Early Late Woodland A.D. 600 to 900-1000

Geographic Area: Northern Michigan

Related Taxonomic Unit: Broad similarities with Allegan, Wayne, and uncollared Spring Creek wares

Skegemog

Method of Manufacture: Not described

Paste and Temper: Fine silty paste; low amounts of grit temper

Color: Not described

Surface Treatment: Medium to coarse cordmarking over entire vessel; some fabric impressed treatments also identified

Decoration: Several decorative treatments described

1. Lip decorations consisting of cord-wrapped paddle edge impressions, cord-wrapped stick impressions, plain tool incising, and punctates
2. Rim interior impressions
3. Single row of large, deep, ovoid punctuates or impressions on the vessel neck
4. Cord-wrapped paddle impressions
5. Cord-wrapped stick impressions

6. Knot impressions
7. Braided and replied cord impressions
8. Plain tool push-pull technique

Vessel Shape: Globular

Rim Form: Rim styles were used to separate three separate types of Skegemog Ware

1. Skegemog Straight Rim: vertical or slightly everted
2. Skegemog Collared Rim: rims and collars tend to be short (although this is the most common variety of Skegemog type ware); collars formed by adding another clay slab to the exterior or pushing the interior surface outward
3. Skegemog Curled Rim: short, sharply curled rim with well defined neck

Lip Form: Flat, round, beveled, and splayed profiles

Chronological Range: Early Late Woodland A.D. 800 to 1000

Geographic Area: Northern Michigan

Related Taxonomic Unit: This type shares similarities with contemporary Mackinac wares and a lesser degree with Spring Creek wares

Traverse

Method of Manufacture: Not described

Paste and Temper: Sandy clay with increased amount of coarse grit (compare to other Skegemog Wares)

Color: Not described

Surface Treatment: Coarse cordmarking or smoothed-over cordmarking

Decoration: Several types based on decorative techniques

1. Traverse Plain (subdivided into Traverse Scalloped and Traverse Undecorated): on Traverse Scalloped lips are deeply scalloped
2. Traverse Pinched: peaked surface formed by pinching lip surface upward
3. Traverse Punctate: (includes two subdivisions Traverse Simple Punctate and Traverse Corded Punctate)

Vessel Shape: Globular to semi-conoidal; weakly defined shoulders

Rim Form: Straight to slightly everted short rims, collars occur on Traverse Plain and Traverse Punctate types

Lip Form: Several lip decorations occur

1. Transverse cord impressions
2. staggered interior marring
3. wedge shaped finger pinching
4. plain tool punctuating
5. incised exterior
6. cord-wrapped dowl impressed

Chronological Range: Late Late Woodland A.D. 1100 to 1550/1600

Geographic Area: Northern Michigan

Related Taxonomic Unit: Contemporary with Juntunen Wares

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