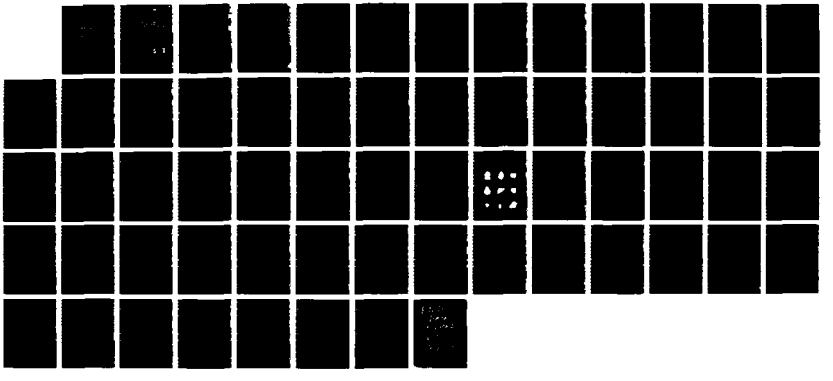
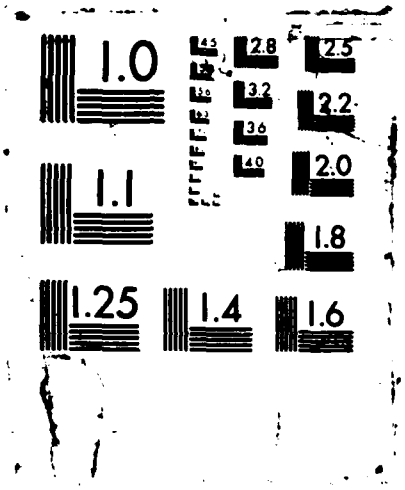
AD-A193 391 INTENSIVE ARCHAEOLOGICAL SURVEY JAMES CLEMENTS AIRPORT 1/1
BAY COUNTY MICHIGAN(U) GILBERT/COMMONWEALTH INC JACKSON
MI D J WEIR ET AL. MAR 88 R-2928 DACW35-87-4-0014
UNCLASSIFIED F/G 5/6 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0

Intensive Archaeological Survey James Clements Airport Bay County, Michigan

U.S. Army Corps of Engineers
Detroit District

Gilbert/Commonwealth Inc.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA193391 / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Intensive Archaeological Survey James Clements Airport Bay County, Michigan	5. TYPE OF REPORT & PERIOD COVERED Archaeological 6. PERFORMING ORG. REPORT NUMBER R-2928
7. AUTHOR(s) Donald J. Weir, Principal Investigator James Robertson C. Stephan Demeter	8. CONTRACT OR GRANT NUMBER(s) DACW35-87-R-0014 Contract Number
9. PERFORMING ORGANIZATION NAME AND ADDRESS Gilbert/Commonwealth Inc. of Michigan 209 E. Washington Avenue Jackson, Michigan 49201	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS	12. REPORT DATE March 1988 13. NUMBER OF PAGES 52
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) U.S. Army, Engineers District Detroit Corps of Engineers, P.O. Box 1027 Detroit, Michigan 48231	15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release;
Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Available from:
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22151

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Cultural Resources:
Prehistoric Archeology Artifacts
Historic Archeology
Historic Preservation
Historical Architecture

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Gilbert/Commonwealth conducted an intensive archaeological survey of the proposed flood control dike construction project at James Clements Airport, Bay County, Michigan. Donald J. Weir served as Pincipal Investigator.

The project area is a proposed dike alignment, located in Sections 8 and 9 of Portsmouth Township (T13NR5E), Bay County, Michigan. The alignment circumscribes James Clements Airport, and measures approximately 8,000 feet in length by 150 feet in width. The total project area investigated is approximately 28 acres
(continued on reverse)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

(continued from front page)

(113,320 square meters.)

Work completed for the project resulted in the location of four archaeological sites; of these, two appear to warrant further work to determine their eligibilty for listing on the National Register of Historic Places. The project was found not to impact the James Clements Airport Administration Building which is listed on the National Register of Historic Places.

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. ADA193391	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* Intensive Archaeological Survey James Clements Airport Bay County, Michigan		5. TYPE OF REPORT & PERIOD COVERED Archaeological 6. PERFORMING ORG. REPORT NUMBER R-2928
7. AUTHOR*(s)* Donald J. Weir, Principal Investigator James Robertson C. Stephan Demeter		8. CONTRACT OR GRANT NUMBER*(s)* DACW35-87-R-0014
9. PERFORMING ORGANIZATION NAME AND ADDRESS U. S. Army, Engineers District Detroit Corps of Engineers, P. O. Box 1027 Detroit, Michigan 48231		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE March, 1988 13. NUMBER OF PAGES 52
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)*		15. SECURITY CLASS. *(of this report)* 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT *(of this Report)*		
17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*		
20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)* Gilbert/Commonwealth conducted an intensive archaeological survey of the proposed flood control dike construction project at James Clements Airport, Bay County, Michigan. Donald J. Weir served as Principal Investigator.		

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

The project area is a proposed dike alignment, located in Sections 8 and 9 of Portsmouth Township (T13NR5E), Bay County, Michigan. The alignment circumscribes James Clements Airport, and measures approximately 8,000 feet in length by 150 feet in width. The total project area investigated is approximately 28 acres (113,320 square meters).

Work completed for the project resulted in the location of four archaeological sites; of these, two appear to warrant further work to determine their eligibility for listing on the National Register of Historic Places. The project was found not to impact the James Clements Airport Administration Building which is listed on the National Register of Historic Places.

INTENSIVE ARCHAEOLOGICAL SURVEY
JAMES CLEMENTS AIRPORT
BAY COUNTY, MICHIGAN

Conducted for:

U.S. Army Corps of Engineers-Detroit District

Contract No. DACW 35-87-D-0043

Delivery Order No. 0003

By:

Gilbert/Commonwealth Inc. of Michigan
209 East Washington Avenue
Jackson, Michigan 49201

Donald J. Weir - Principal Investigator
James Robertson
C. Stephan Demeter

R-2928

March, 1988

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The following report presents the results of an intensive archaeological survey of the proposed flood control dike construction project at James Clements Airport, Bay County, Michigan (Figure 1). This project is being undertaken by the U.S. Army Corps of Engineers, Detroit District. The research was completed by Gilbert/Commonwealth as Delivery Order No. 0003 of Contract No. DACW35-87-D-0043. Donald J. Weir served as Principal Investigator. C. Stephan Demeter directed the fieldwork, and was assisted by Steve Sanderson. The mapping of sites 2 and 4 was completed by James Towler. He was assisted by Monica Collett in this effort. The investigation was conducted during late October, 1987. Total project area investigated was approximately 28 acres (113,320 square meters). Sixteen person-days were expended completing the fieldwork.

The project area is a proposed dike alignment located in Sections 8 and 9 of Portsmouth Township (T13N R5E), Bay County, Michigan (Figure 2). The alignment circumscribes James Clements Airport, and measures approximately 8,000 ft. in length by 150 ft. in width. Total area is approximately 28 acres. The alignment adjoins the inside margin of the interior drainage ditch associated with the existing dike surrounding the airport. Figure 2 shows the land use of the project area at the time of the survey. This consisted of a combination of cultivated fields, scrub vegetation, and planted grasses. The scope of work issued by the Corps of Engineers required that the project area be surveyed to determine the existence of potentially significant archaeological and historical sites. The investigation was conducted pursuant to the provisions of the National Historic Preservation Act of 1966 (P.L. 89665), as amended; the Archaeological Resource Protection Act of 1979 (P.L. 96-95); and 36 CFR 800, 36 CFR Part 60.

The scope of work provided by the Corps of Engineers outlined the survey strategy to be used for the project. In areas already in cultivation, the project team was required to undertake a surface inspection. In areas to be plowed, the surface inspection was to be conducted not sooner than three days after plowing and preferably not until the field had been weathered by rain. Survey transects were not to be separated by more than 5 meters, and at least nine survey transects

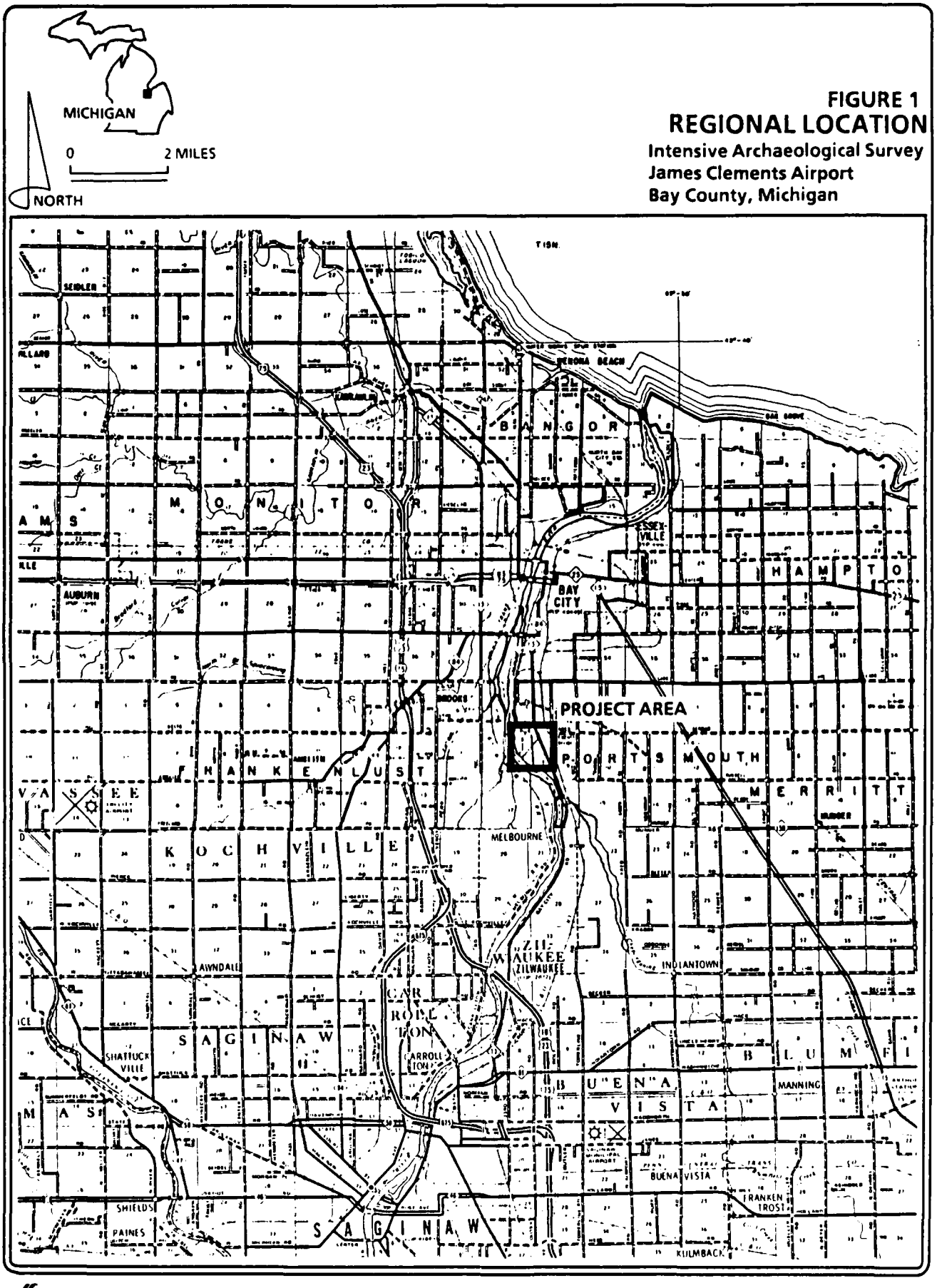


FIGURE 1
REGIONAL LOCATION
Intensive Archaeological Survey
James Clements Airport
Bay County, Michigan

Gilbert/Commonwealth Inc. of Michigan

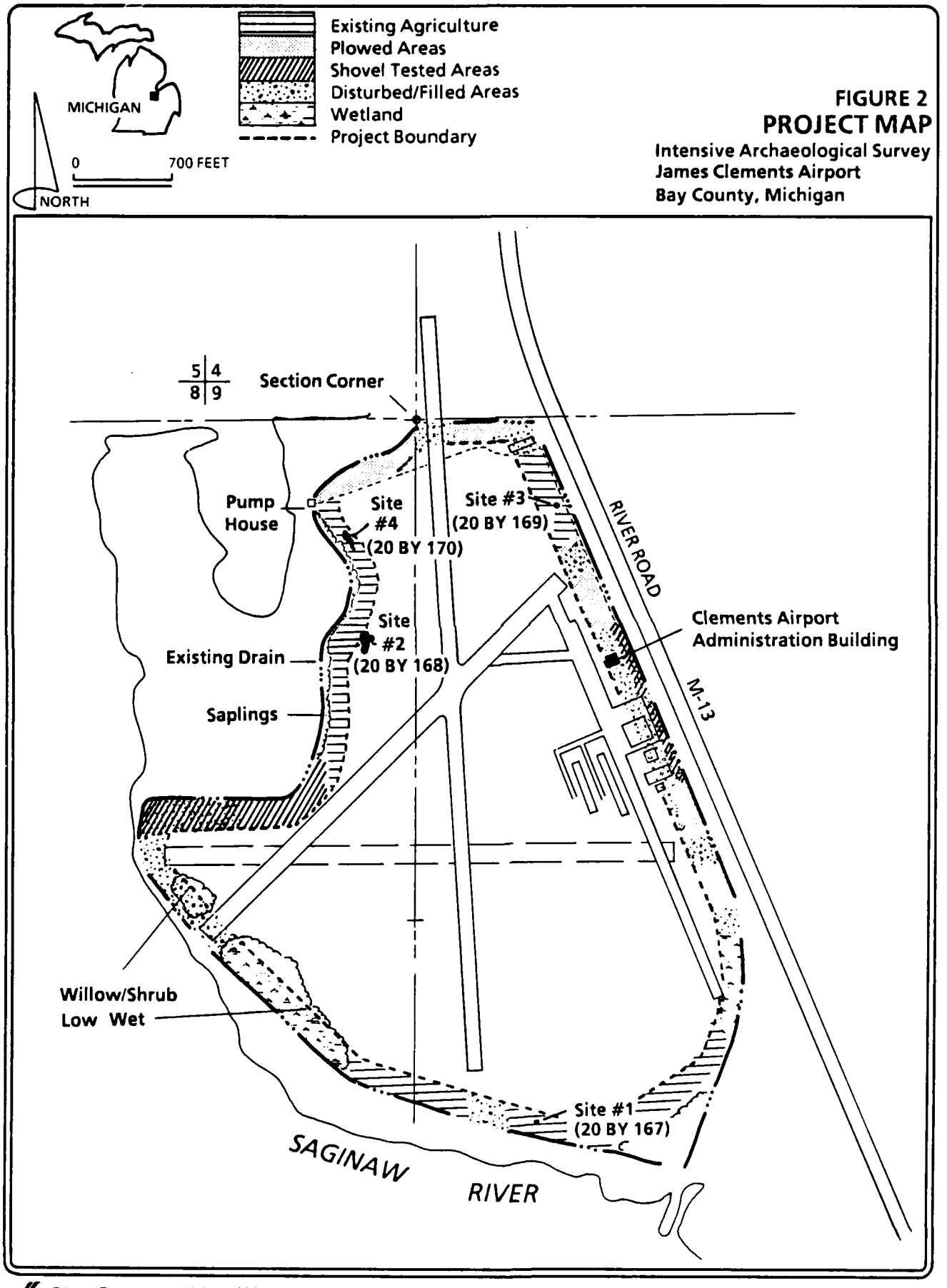


FIGURE 2
PROJECT MAP
Intensive Archaeological Survey
James Clements Airport
Bay County, Michigan

Gilbert/Commonwealth Inc. of Michigan

were to be undertaken in the 150-foot project zone. The Field Methodology section of this report details these activities for the project area.

The work completed for this project resulted in the location of four archaeological sites. Of these, two appear to warrant further work to determine its eligibility for listing on the National Register of Historic Places. Detailed recommendations are provided in the Conclusions and Recommendations section of this report.

The following report was authored by Donald J. Weir, James A. Robertson and C. Stephan Demeter. Mr. Demeter provided the historical background section of the report, Mr. Robertson the artifact analysis, and Mr. Weir the remainder.

PROJECT BACKGROUND

Prior to the start of the fieldwork, a review was undertaken of the archaeological site files maintained by the Bureau of History, Department of State, State of Michigan. This review determined that several previously recorded sites are located in the vicinity of the project. Site 20BY123 is reported to be located in the W1/2 of the NW1/4 of Section 9 T13N R5E. This location would put the site on the airport property. The site is reported to be a cemetery located on the Schmidt Atlas (Butterfield, copy at the Bureau of History). The field investigation undertaken for this project failed to locate any evidence of this site. The next closest site is 20BY68, located northwest of the project area. This site is commonly known as "Skull Island" and is listed as an historic aboriginal cemetery. Mr. Keith Ryder of the Chicago District, Corps of Engineers has recently visited this island and has reported that significant archaeological resources are present (Keith Ryder, personal communication 1987).

Another site located in the vicinity of the project is 20BY183, commonly known as Stony Island. It is located due west of the project area in the middle of the Saginaw River, and is listed as an Archaic village site.

The only professional research to be undertaken on the project site was an archaeological survey of a new runway completed by Caminos Associates in 1983 (Prahl 1983). In this report, Prahl described the area as a "wetland environment that has been modified by modern fill activities." His survey of the proposed new runway failed to locate any evidence of significant archaeological sites.

A detailed discussion of the Saginaw River area is contained in Michigan State University's report on the Third Street Bridge Project (Lovis and Robertson 1986). Most important for an understanding of the cultural history of the project area is the discussion of the glacial history of the Saginaw River area. Throughout its history the project area was variously submerged and exposed as the Huron Basin water level changed in response to pre- and post-glacial conditions. The elevations (of sites 2 and 4) at 582.5 feet above mean sea level (amsl) were exposed when the water of the post-glacial Nippissing stage receded to the Algoma stage lake level (Lovis and Robertson 1986:5).

Considering the glacial history of the project area, any prehistoric occupation would date either to the Terminal Late Archaic or Woodland period. By Late Archaic times, the post-glacial environment had stabilized, and there appears to be a greater frequency of archaeological sites. It would appear that technologies and cultural patterns already evident in the Early and Middle Archaic periods achieved greater adaptive advantages during the Late Archaic. At any rate, population seems to have expanded greatly in comparison with earlier periods. The first evidence suggesting the use of the Saginaw Valley as a "homeland" by prehistoric people occurs in Late Archaic sites (Brashler and Holman 1985).

In response to environmental changes, modifications in aboriginal settlement and subsistence strategies occurred. By exploiting various food resources, Late Archaic people developed a highly diverse economy. Seasonal band fission and fusion in response to resource availability was the foundation of the Late Archaic settlement/subsistence system. Late Archaic sites are commonly marked by the preference of stemmed and notched projectile points. Ground stone tools such as grooved axes and chisel-shaped celts are common, as are slate items termed bannerstones and birdstones. Triangular blades of chipped stone are also common.

Late Archaic sites in the Saginaw Valley exhibit evidence of frequent re-occupation and use for several hundred years or more. Large multicomponent sites as well as smaller encampments are found throughout the valley, and it is likely that relatively complete settlement systems are represented (Brashler and Holman 1985). Lovis (1985) has postulated that the environment of the Saginaw Valley during the Late Archaic was such that food could be obtained in the vicinity of the same site during any season of the year. This is reflected in the archaeological record as ambiguity with regard to the possible season of occupation (Brashler and Holman 1985; Lovis 1984).

The appearance of pottery, around 1000 B.C., marks the emergence of the Early Woodland period. Some cultigens may also have appeared by this time, although, in general, this period marks a continuation and development of processes evident in the Late Archaic. Cultigens initially comprised an additional resource of the basically Archaic diffuse economy, and did not significantly alter the subsistence base, though Lovis (1985) argues that these activities may have a

greater time depth than the Early Woodland, going back at least to the early Late or late Middle Archaic.

Except for ceramics, the material cultural assemblage is much the same as the Late Archaic. Early Woodland pottery is crude, thick, massively tempered and poorly fired. These ceramics are often interior and exterior cord-marked and include the well-known types Marion Thick, Vinette I and Schultz Thick (Fitting 1975:91). Shouldered and round-based projectile points, possibly indicating ties to the Adena culture in the Ohio Valley, are diagnostic.

The Early Woodland period, until recently, was primarily represented by rather ambiguous informant reported - and looted - burials. Surface finds include Adena-like projectile points of Indiana hornstone, Cresap points (Dragoo 1963) and Meadowood points of Onondaga chert. The dominant view of the Early Woodland adaptation in the Saginaw Valley was expressed by Ozker (1977, 1982). This was based primarily on the Schultz site occupation, for which she argues that the scheduling and spacing of subsistence activities were somewhat different from those of the Late Archaic. As discussed earlier, Lovis (1985) argues that there was not a significant change in these subsistence activities and that the Late Archaic pattern was maintained during this period.

The Middle Woodland period (ca. 200 B.C.-A.D. 500) is often defined as exhibiting a definite Hopewell cultural influence in ceramic stylistic elements and elaborate burial procedure. In general, though, most Michigan Middle Woodland sites appear to retain more of an indigenous non-Hopewellian settlement and subsistence pattern which is found in the more northern Lake Forest Middle Woodland. Evidence indicates large summer camps dependent on fishing, and small winter hunting camps, while true Hopewell sites may have had an agricultural base (Struever 1964, 1965; Fitting 1972). The Schultz site appears to have had a central role in the Saginaw Valley during the Middle Woodland period (Lovis 1985), and to have been occupied throughout this period (Fitting 1972).

The Late Woodland period (ca. A.D. 500-A.D. 1500) is initially marked by an increase in population as well as in the size and the number of aboriginal sites, the assumption being that the reliance upon agriculture as a viable subsistence strategy

facilitated a shift to permanent village life with task specific camps established outside the main village.

Cultigens may have been first utilized in the Early Woodland period (Ozker 1977, 1982), but do not become an important factor in determining settlement system and social organization until Late Woodland times (Fitting 1975:144). Not all Late Woodland groups relied upon agriculture, due to vagaries of culture, natural resources, and climate, but maize, introduced in Michigan around A.D. 1000 (Yarnell 1964:107; cf. Fitting 1975:144), became a focus of exchange between agricultural and non-agricultural peoples.

The Late Woodland period is marked artifactually by side- and corner-notched projectile points such as the Jack's Reef variety (Fitting 1975:52), which are supplemented through time by the triangular Levanna and Madison point types (Ritchie 1961). Wayne and Younge tradition ceramics are diagnostic, and varieties of the former ware are often associated with a distinctive mortuary complex (Halsey 1976, 1981).

Wayne ware is a transitional Middle to Late Woodland pottery, marked by globular cord-marked pottery with plain rims and non-elaborate decoration. Projectile points are small pentagonal and corner-notched forms. Also characteristic are rolled copper beads, copper awls, small celts, and columella shell beads. Most Wayne tradition sites in southeast Michigan are burials, indicative of the Wayne mortuary complex, dating to ca. A.D. 500-A.D. 1000 (Fitting 1965; Halsey 1976, 1981).

The Younge tradition material culture is characterized by large globular to elongated pottery vessels that are usually collared and often castellated, and exhibit complex rim and shoulder designs. This tradition may have been more reliant upon maize horticulture than earlier expressions.

However, traditional economic systems were not totally altered. Even with corn and beans horticulture, scheduled movements were still the rule to take advantage of seasonably available natural resources (Ozker 1979). Thus, while villages were located along floodplains on the Great Lakes shorelines for access to

easily tillable soil, riverine resources, and transportation, seasonal camps were located along headwaters of river systems in upland areas (Stamps and Zurel 1980:139). These were situated to take advantage of an entirely different set of resources such as deer, starchy roots and tubers, small mammals, and waterfowl.

Despite the amount of research that has been undertaken in the Saginaw Valley, the Late Woodland period occupation is not well understood. This is due in part to the fact that few sites with substantial collections postdating A.D. 1000 have been excavated and/or described (Brashler and Holman 1985). For a long time the prevailing hypothesis (Fitting 1971) contended that the Saginaw Valley did not support a permanent residential population and that the area was used on a scheduled or shared basis by groups from adjacent areas.

In a recent article in Arctic Anthropology, Brashler and Holman (1985) examined this hypothesis in light of more recent data and suggested alternate hypotheses to explain the paucity of Late Woodland sites in the Saginaw Valley. They argue that this is a change in the occupation of the Saginaw Valley beginning between A.D. 900 and A.D. 1000 and continuing until the valley was abandoned after A.D. 1400. The hypothesis they favor to explain this is that during the early Late Woodland period, the Saginaw Valley area constituted the homeland of makers of Wayne ware and was periodically visited by neighboring populations. As time passed this resident population was either absorbed into these neighboring populations or left the valley entirely. By the late Late Woodland, there appears to be no resident population in the valley, but it was continuously used by non-resident populations for substitute activities (Brashler and Holman 1985:149).

During the initial phase of Euro-American and Amerindian contact, the Saginaw region appears to have been utilized generally for hunting and gathering purposes by a number of upper Great Lakes tribes, which included Huron (i.e., Wyandot), Ottawa and diverse Objibwa-Chippewa groups. Traditional history of the region also suggests its occupation by the Sauk. Oral histories collected among the Saginaw and Chippewa during the nineteenth and early twentieth centuries stressed the fact that the Sauk had been driven from the area after a protracted period of warfare. Probable confirmation of this legend appears to exist in the contemporary literature. In 1675, the Jesuit priest Henri Nouvel, while traveling with the

"Amicoust" (identified by Greenman as the Amikwa clan of the Nipissing), is believed to have entered the Saginaw and referred to the region as the "former country of the Sachis" (Fitting 1970). Similarly, an account provided by another Jesuit, Claude Dablon (ca. 1670), indicated that the Sauk, Potawatomi and Nation de la Fourche, then residing at Green Bay, also lived there, "...But as strangers, the fear of the Iroquois have driven them from their lands, which are between the Lake of the Hurons and that of the Illinois" (Hodge 1912:473). Hodge has suggested that the Iroquois or Nadō'weg, in this case, actually consisted of an allied force of Ottawa and Neutrals which succeeded in driving out their enemies, the Asistagueronon (i.e., People of the Place of the Fire), from their homeland in about 1642 (Hodge 1912:474).

Numerous interpretations of the term Saginaw have stressed a possible Sauk affiliation. The earliest of these appears to be presented in Edwin James' Biography of the Chippewa captive, John Tanner (i.e., Shaw-shaw-wa ne-ba-se), published in 1830. While not referring to Tanner as his source of information, James suggested in a footnote to this text that "sau-go-nong, appears to mean, the town of the Saukees'" (James 1830:9). A number of years later, Schoolcraft (1857:484) arrived at the same conclusion, referring to Saginaw as having been derived from the Algonquin term Sauk-i-nong. In his analysis of geographical place names, Verwyst (1892:393) identified the modern usage of the word Saginaw as being a corruption of the Chippewa term Osaginang or "place where the Sacs used to live." The "Handbook of American Indians North of Mexico," published as Bulletin 30 of the Bureau of American Ethnology, lists Saginaw both as having "apparently" been derived from Sāginā' we' (i.e., the country or place of the Sauk) or from Saginawa, meaning "river-mouth" (Hodge 1912:471, 409). This latter interpretation also agrees with Cadillac's statement relative to the origin of the Sauk tribal name: "The nation of Sakis is so called because Saky means 'the entrance of the River'" (Thwaites 1902:360).

While French documents of the late seventeenth century appear to provide supportive evidence of Sauk habitation within the Saginaw Valley, contemporary documentation dealing with their expulsion from the region is lacking. In fact, many of the later commentaries are themselves subject to interpretation, rendering it impossible to establish with any degree of historical accuracy the validity of this assumption.

Traditionally, the site of the Sauk defeat has been identified as Skull Island, lying immediately northwest of the airport, and designated as site 20BY68 in the Michigan Bureau of History archaeological site files. Because of the vagaries associated with the Sauk presence in the Saginaw Valley, at least one researcher has associated the temporal setting of this conflict with the 1711-12 Mascoutin-Fox intrusion into eastern Michigan (Emmert 1963:131).

The use of the term "Saquinam" as a regional geographic designation first appears in the literature in a letter of Denonville, the French commandant at Michilimackinac, dating to the spring of 1686. Denonville identifies the term as the native designation for the lands lying "between Lake Erie and Lake Huron" which were then utilized by the Huron and Ottawa as a winter hunting ground (O'Callaghan 1855:283). The Baron Lahontan, writing during the same period, indicated that the Ottawa scheduled their hunting activities in the Saginaw Valley every two years (Fitting 1971:31).

The establishment of the French post at Detroit in 1701 fostered extensive movements of native peoples in the Upper Great Lakes region. Both the Huron and a significant portion of the Ottawa moved from Michilimackinac and settled near the new French post, as did other tribes such as the Potawatomi and Miami. Such movements naturally had a dramatic effect upon regional land use and economic patterns among various groups involved. As a direct result of these movements, competition for control of newly available resources and the maintenance of previously held claims soon led to the development of a conflict situation. As early as 1706, hostilities erupted between the Huron and Ottawa when the former tribe established a series of trade relationships with the Miami and other southerly tribes, a measure which circumvented the traditional middleman role held by the Ottawa in the upper Great Lakes Indian trade. It was only through the intervention of the French that open warfare was averted. The drawing away of native populations toward the vicinity of Detroit appears to have created a gap which allowed for the influx of other tribal groups into Michigan, as is indicated by Dubuisson's comment concerning the appearance of Mascoutin hunting parties on the upper St. Joseph River during the winter of 1711-1712 (Thwaites 1902:269). During the following spring, both the Mascoutins and Fox established a village at Detroit. Although the exact details of what occurred during the next several

months are obscured by contradictory accounts, both tribes soon became embroiled in open warfare with the French and their Indian allies who had settled near the post. This action may well have been precipitated by an attack the Potawatomi and Ottawa made upon the small Mascoutin winter encampment on the St. Joseph River. The destruction of this encampment and subsequent defeat of the Mascoutins and Fox at Detroit led to more than a decade of almost constant warfare. To a significant degree, the activities of the "Savages from Saghinan" seem to have been largely responsible for prolonging this conflict (Thwaites 1902:428-430).

Throughout the eighteenth and early nineteenth centuries, Euro-American influence in the Saginaw area was little more than peripheral. In 1741, the Sieur de Blainville, probably with a small detachment of French troops from Detroit, was ordered to winter quarters among the "Saguinan" in an effort to prevent them from trading with the English (Thwaites 1908:368). Several years later, in 1747, the "Outaouas of Saguinam" are reported to have murdered three French traders and to have taken an active part in the abortive rebellion engineered by the Wyandots under Orontony against the French post at Detroit (Thwaites 1908:462). The availability of low-priced English trade goods was becoming an increasingly important factor in the economic and political life of the Great Lakes tribes. While the Saginaw Indians made their peace by surrendering those involved in the murder of the French traders, they apparently continued to maintain close trade relationships with the British. Because of this situation, the French Commandant at Sault Ste. Marie is reported, in 1751, to have ordered the Chippewa of that region not to return to their wintering grounds at Saginaw (Thwaites 1908:101).

The British conquest of the French North American colonies had little effect upon the Saginaw Valley. While furs continued to remain the major commodity produced in the region, as late as the 1780s, only one trader, based at Michilimackinac, was known to be operating at Saginaw. A census of tribal groups published in 1778 identifies both the "Chippewas and Ottawas" as being located on Saginaw Bay and possessing a male population numbering about 200 individuals (Schoolcraft 1857:714).

As previously noted, the identification of ethnic affiliation among the Saginaw Indians is a complicated affair. This problem, to a significant degree, is doubtless the result of intermarriage between both the Chippewa and Ottawa, as is suggested in the Tanner account (James 1830:15). Due to certain environmental configurations which exist within the physiographic makeup of the Saginaw Valley, Fitting (1971) has further suggested that the Ottawa "tended to merge ecotypically with the Chippewa." The transition to a diffuse economic pattern of adaptation was accelerated during the late eighteenth century, with the collapse of the system of native trade networks which previously existed among tribal groups inhabiting the Carolinian and Canadian biotic provinces. This situation effectively eliminated the traditional middleman role held by the Ottawa (Fitting 1971:40).

Native title to most of the Saginaw region was terminated, with the exception of a number of reservations, through the Treaty of Saginaw, concluded in 1819. One of these reserves included a 1,000-acre tract "near the island in the Saginaw River" encompassing the northern third of the airport property (Deloria n.d.:28), and still appears on the 1973 USGS Bay City Quadrangle (7.5').

Through the Treaty of Detroit, concluded on January 14, 1837, both these and adjacent reserve lands were ceded to the United States, which was to sell them at $5.00 an acre (Butterfield 1918:65). This agreement allowed the tribe to reside on their reservation lands for a period of five years, until they could be resettled in Wisconsin, west of Lake Superior, or at an as yet unspecified location west of the Mississippi River (Deloria n.d.:69). The same year witnessed the outbreak of a smallpox epidemic in which upwards of 354 members of the tribe died. This situation was further complicated by flooding which "either damaged or wholly destroyed" their corn crop for that year. A census of the Chippewa in Saginaw County conducted in 1838 listed the tribal population as being 993 individuals (Schoolcraft 1857:498).

Although the Treaty of Detroit had been concluded along lines prescribed by the Indian removal policy adopted under the Jackson Administration, this aspect of the agreement was never carried into effect. Significant numbers of Chippewa from the Saginaw region either moved to other portions of the state or to Canada, while others continued to reside on unorganized government lands. A second

treaty, concluded at Detroit in 1855, established the Isabella Reserve from a portion of these lands.

Louis Campau is generally reputed to have been the first white settler in the Saginaw Valley, having established a trading house within what is now the city of Saginaw in 1816. Several years later, in 1824, the American Fur Company also opened a post, as did numerous independent traders. As late as 1821, John R. Williams noted that virtually the entire production of furs shipped from Detroit during that year had been obtained from the Saginaw Valley (Dain 1956:123). While overhunting soon reduced the importance of this trade, the fur industry still amounted to $30,000 per annum in 1858, when it accounted for approximately 2 percent of the region's total economic output.

Euro-American settlement in the years following the signing of the 1819 treaty was only marginal. Surveying parties operating in the Saginaw often met with resistance from the Indian inhabitants. In 1822, a detachment of the Third U.S. Infantry established itself at Fort Saginaw. However, disease broke out among the troops and forced the abandonment of the post during the following year. The commander of Fort Saginaw, Major Daniel Baker, provided anything but a glowing report to his superiors about the possibility of settlement in the Saginaw Valley, noting that "nothing but Indians, muskrats and bullfrogs, could possibly subsist here" (Mills 1918:60). When De Tocqueville visited the Lower Saginaw settlement in 1831, he found a community composed of only 30 individuals, which included "Canadians, Americans, Indians and half-castes." He also noted that it received supplies from Detroit by ship only once a year. Although this decade marked one of the heaviest periods of immigration into Michigan, the total white population of Saginaw County (inclusive of Bay County) was no more than 892 in 1840 (U.S. Dept. of State 1841). Upwards of 90 percent of the total population was dependent on agriculture for their livelihood, with the chief products of export being corn, potatoes and maple sugar.

In conjunction with Michigan's Internal Improvement Act, the Morris Canal and Banking Company and the newly created Saginaw State Bank financed the survey of a proposed canal on the Bad River in 1837. A $5 million state loan was soon obtained, and construction upon what was officially known as the "Northern

Canal" began the following year. It was believed that the opening of this thoroughfare would allow farm products of central Michigan easier access to the market places of Detroit, Buffalo and the East via the Saginaw River. The economic collapse of 1837 soon broke this speculative venture. During the summer of 1839, work on the canal was stopped after an expenditure of approximately $22,000 in improvements. No traces of this canal were observed within the study area.

It was this early period of expansion that brought in the first few settlers to Upper Saginaw, as Bay City was then called. In addition to supplying the Detroit market with small amounts of agricultural foodstuffs, fish and furs, by 1836, with the opening of a sawmill, pine lumber also began to figure as an element of the regional economy (Butterfield 1918:95).

Throughout the 1840s, the Saginaw Valley witnessed only marginal increases in economic development. By 1850, the region possessed a white population of 2,609, with a total of 10,811 acres of land under private ownership. Improved, or agriculturally productive lands, however, amounted to only 2,930 acres (De Bow 1853). While farming remained the principal activity in the area, lumbering was fast becoming a major industry. In 1845 Hopkins, Pomeroy and Fraser opened the first steam mill near the corner of Water Street and Center Avenue and, in 1847, the first shipments of Saginaw cork pine were made to the Eastern markets (Mills 1918:396). In 1851, approximately 92 million board feet of lumber were processed. Several years later, in 1853, 23 sawmills were operating on the various tributaries of the Saginaw River, with an additional 21 reportedly under construction. By 1858, the lumber industry and its various branches had become the single most important economic element in the Saginaw Region, producing approximately $952,000 worth of goods during that year.

The expansion of the lumber industry fostered increased settlement, and the establishment of a viable communication network to the south. This latter facet of development was accomplished by the completion of a plank road from Saginaw to Flint, and hence, to Detroit in 1851, and also through the construction of a railroad line to Flint in 1858.

The lumber industry, throughout the remainder of the nineteenth century, continued to form the backbone of the region's economy. Lumber production in 1861 amounted to 120 million board feet and was to increase to over 500 million board feet per year by the close of the decade. After reaching a peak of 1,011,274,605 board feet in 1882, the industry began to level off and, after about 1890, witnessed a dramatic decline. By 1897, the mills produced only 339,991,000 board feet of white pine lumber, much of this actually having been harvested from other areas in both Michigan and Canada. During this period, the lumber industry provided the impetus for the rise of other industries such as ship building and barrel manufacturing, which shortly became major enterprises in the Bay City economic environment.

While lumbering supplied the impetus for expanded development, its long-term impact, like that of the fur trade, had only marginal effects upon the future socioeconomic development of the region. The short-sighted quest for the dollar, combined with the lack of selective harvesting techniques, soon destroyed what, in present day terminology, would be referred to as a "renewable resource." The clear-cut approach of the nineteenth century lumber baron did, however, provide an opportunity to further agricultural expansion in the county. Agricultural growth continued to increase throughout the remainder of the century, a situation which was facilitated by the introduction of the sugar beet industry during the late 1890s.

Coal mining was one of the pursuits that became steadily more important to the region's economy following the collapse of the logging industry. Although coal deposits were known to exist in the Saginaw Valley as early as the late 1850s, it was not until 1895 that any commercial exploitation of this resource was attempted.

Land use of the subject property was marginal throughout the latter nineteenth century with the location in 1896 being identified as in the possession of the McGraw Lumber Company (Bullock 1896:E). Subsequently, passing into the hands of the North American Chemical Company, by the early 1920s the property was already subject to freelance use by early Bay City aviators. In 1924, the Bay City Chamber of Commerce, with the financial support of William L. Clements, formed a committee to select a site and develop an airport. In 1927-1928 the

North American Chemical property was acquired, and work on the airstrip began. As with the problems reported in the 1986 reconstruction of the north-south runway (Runway 18/36), when the airport flooded with the collapse of a flood protection dike in 1927, it reportedly took 3 days to pump the Saginaw River overflow off the site (Prahl 1983). Named after Clements' son, James R. Clements, a naval pilot who had died during World War I, the airport was opened in 1928 and dedicated 2 years later (Snyder 1987:10-11). The Airport Administration Building at the eastern edge of the project area along River Road is listed on the National Register of Historic Places.

FIELD METHODOLOGY

Survey techniques were prescribed by the scope of work issued by the U.S. Army Corps of Engineers, Detroit District. Several different discovery techniques were called for in the scope of work. Those portions of the project area in cultivated field were inspected by the use of surface inspection. Prior to the survey, these cultivated fields contained sugar beets, whose dense growth provided almost no surface visibility. Therefore, the survey was delayed until after harvest, when the freshly plowed and/or disked fields offered almost 100 percent visibility. All cultivated fields in the project area were walked using 5 meter transect intervals; each 150-foot parcel contained at least nine such transects. As stated in the scope of work, any alignment segment in which half or more of the surface was exposed was considered to be cultivated and was evaluated using a surface inspection procedure.

The remainder of the project was inspected to determine where it would be necessary to clear and plow prior to a surface inspection. This activity determined that several areas of the airport ground surface were heavily disturbed by either former construction or modern filling activities. In addition, the existing diking and ditching have caused considerable disturbance in their near vicinities. Specifically, the ends of the new runway are heavily disturbed, as are the edges of the interior drain. These areas were subjected to periodic shovel testing to confirm this visual observation. If this activity determined that an area was disturbed, then no additional investigations were undertaken. Figure 2 of this report outlines these areas in detail.

Once a site was located, the scope of work required that it be recorded in a systematic fashion. Two of the four sites (Nos. 1 and 3) found were find spots and were not subjected to any type of systematic recording. The other two sites (Nos. 2 and 4) were extensive in nature and were subjected to systematic collection. Once the sites were located and the vertical extent determined, the survey crew returned to the sites and flagged each artifact and assigned a controlled collection number (CC No.) to each. The location of each artifact was recorded by the means of a T-2 Theodolite and electronic distance-measuring equipment. Once the

location of each artifact was recorded, each was collected and bagged separately. Each site was tied into two permanent control points, forming a basis for the relocation of the sites in the future. In addition, the sites were tied into the known elevation of the airport runway so that a precise elevation could be determined for each (Figures 3 and 4).

Based on the perceived importance of sites 2 and 4, it was decided to excavate a 50 cm x 50 cm unit in each to help determine the depth of deposits and provide a profile of the sites. Once such unit was picked for each site based on the distribution of the artifacts as indicated by the pin flags in the field. The units were situated in the areas of the sites which were judged by field observation to contain a heavy concentration of material. Each unit was excavated using arbitrary 10 cm levels. All soil was screened through 1/16 inch hardware cloth and material collected and bagged by levels. Excavation was continued until two consecutive sterile levels were encountered. The locations of these excavation units are shown on Figures 3 and 4.

Upon returning the artifacts to Gilbert/Commonwealth's archaeology laboratory in Jackson, Michigan, each artifact was washed and prepared for subsequent analysis. Detailed analysis procedures are discussed in the following section of this report.

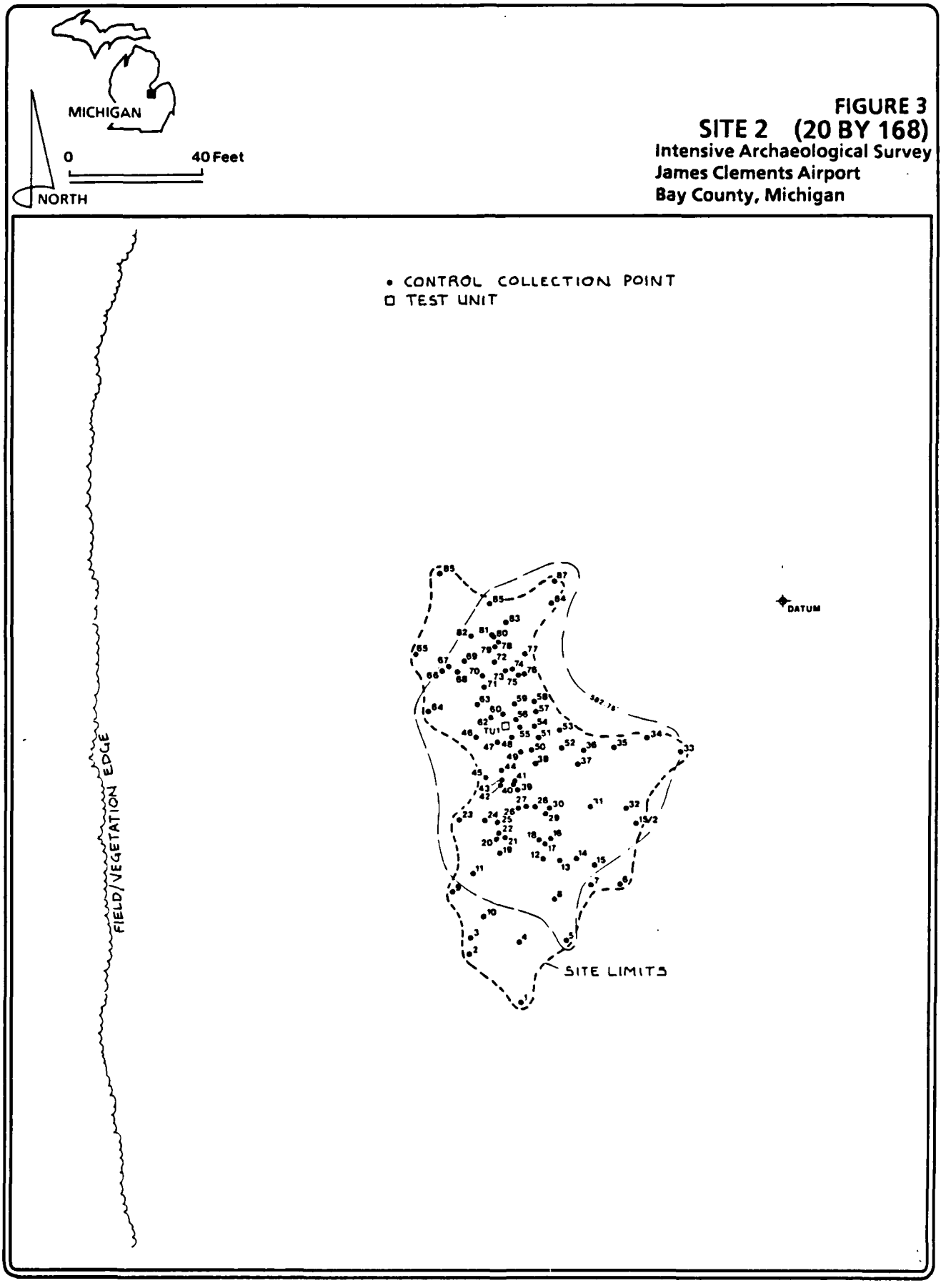


FIGURE 3
SITE 2 (20 BY 168)
Intensive Archaeological Survey
James Clements Airport
Bay County, Michigan

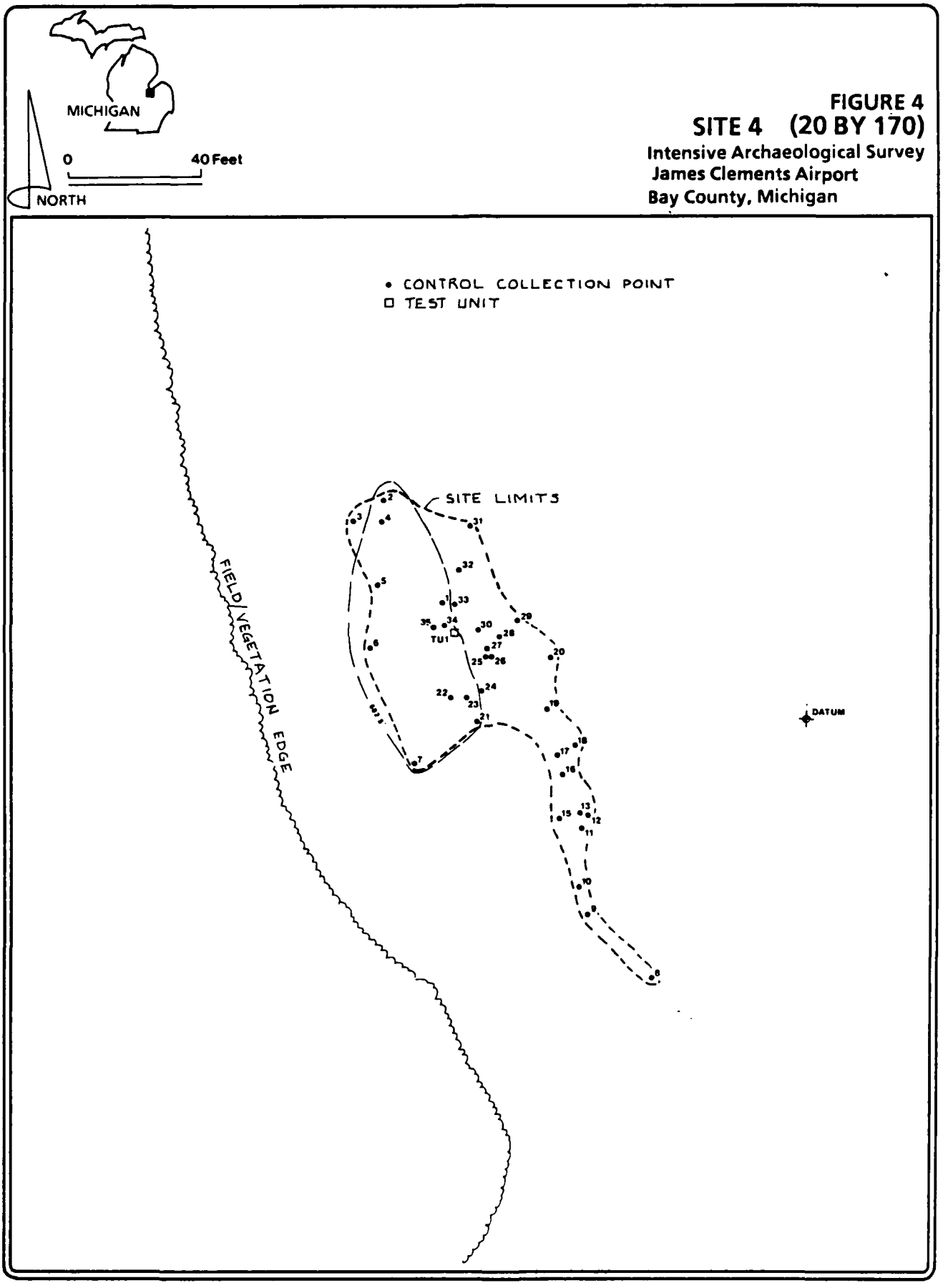


FIGURE 4
SITE 4 (20 BY 170)
Intensive Archaeological Survey
James Clements Airport
Bay County, Michigan

Gilbert/Commonwealth Inc. of Michigan

ARTIFACT ANALYSIS

METHODS

The archaeological assemblages from sites 1, 2, 3, and 4 from the James Clements Airport, Bay County, Michigan, are, with the exception of one mammal bone fragment from site 2, comprised of three general types of artifacts: chipped stone artifacts, ground/pecked stone tools, and fire-cracked rock. All fire-cracked rock was examined for traces of use, counted, and weighed. The weight, size, area(s) of utilization and material type of each ground/pecked stone tool were also identified and recorded. Length of each tool was defined by its long axis with width and thickness measured along the axes perpendicular to length.

The chipped stone assemblage was subdivided into tools, edge-damaged/ utilized flakes, and debitage. The raw material types were recorded for all artifacts. Raw materials identified include Bayport chert, Norwood chert, greywacke and glacial or unidentifiable cherts. Further discussion and frequencies of each raw material type will be presented in later sections as they apply. The presence or absence of evidence for heat treatment was also noted based upon the experimental results of Robertson (1987:222-223) with Bayport chert. As Robertson has emphasized, the effects of heat treatment may not be visible macroscopically, and, unless an artifact is sonically cleaned, the lustre criterion should not be employed. Therefore, the frequency of heat treated artifacts is a rough approximation at best.

Artifacts classified as tools are minimally defined by the placement of intentional retouch resulting in a patterned modification of edge shape and/or edge angle. The flake scars from intentional retouch are consistent in shape, size, and placement, and are continuous over all or part of an edge. A techno-morphological system of classification based upon the location and orientation of retouch is employed in this report and can be inferred from the individual artifact descriptions below. Detailed definitions of specific types are given elsewhere (Robertson 1987:Appendix C). Three basic categories of tools are separated: bifaces,

unifaces, and pieces esquillees. The latter group of tools are produced by bipolar percussion and are often referred to as "wedges" in the archaeological literature.

Each tool was weighed and measured. Edge angles, when possible and relevant to the description of an artifact, were measured with a goniometer fashioned from a protractor. These are regarded as estimates only, since edge angles could vary quite markedly depending upon the location of the measurement(s). When necessary, observations of the edges were facilitated by the use of a 5X handlens. All bifaces and pieces esquillees were measured in three dimensions with length parallel to the long axis of the tool; width and thickness were measured along the major axes perpendicular to the length. Additional measurements taken for the one projectile point/knife follow White (1968:51). The length of each unifacial tool was taken as the axis of percussion, width perpendicular to the axis of percussion, and thickness perpendicular to the flake faces. The type of flake on which each tool was manufactured was also recorded.

In contrast to formal tools, edge-damaged/utilized flakes have flake scars that are usually small (<1-2 mm in maximum dimension) and are inconsistent in shape, size, angle of flake scar initiation, and/or areal extent. In this report, edge-damaged/utilized flakes are not considered formal tools. Accidental edge damage produced by spontaneous retouch, soil pressure, trampling, and plowing is a common phenomenon and can mimic edge damage from use (Betts 1977; Keeley 1980; Knudson 1979; Newcomer 1976; Stapert 1976), while straight edges often sustain little or no edge damage even with extensive utilization (Moss 1983). Further, extensive experimentation has resulted in contradictory results and, at best, only general tendencies in the interpretation of edge damage from use (Vaughan 1985) where previous analyses have suggested strong associative patterns. Edge-damaged/utilized flakes are classified separately from debitage, however, because their edge morphology differs from unmodified debitage and the possibility that many may have been used as tools. Observations recorded for these artifacts follow those taken for unifacial tools as well as the type of flake and location and dominant type of edge-damage scars. Edge-damage scar types follow Keeley (1980).

Unmodified debitage was classified to reflect the flaking technology, reduction sequence, and manufacture of tools. Two basic types of debitage include cores and flakes. Cores are defined as any block of raw material from which flakes have been removed systematically for the production of flakes and tools. Each core was measured in three dimensions as with bifaces, and weighed. Flakes with striking platforms were subdivided into eight categories based upon three variables: the presence or absence of significant striking platform preparation in the form of multiple facets and grinding (simple versus complex platforms), the presence or absence of cortex on the dorsal face and/or striking platform of the flake (interior versus cortical flakes), and angular or blocky versus flat flake profile. Flake fragments were subdivided on the basis of the latter two criteria. Core trimming or platform rejuvenation flakes comprise the last flake type. These artifacts are produced when it is necessary to remove collapsed or unsuitable flaking platforms. All flakes were weighed and measured. Measurements were taken along the maximum dimension of each flake on an ordinal scale of 10 mm increments.

Chert reduction and tool production processes are reflected by this classification in the following manner. Core trimming/platform rejuvenation flakes, and both angular and flat flakes with simple platforms tend to be associated with core production and core reduction activities. Cortical flakes of this type may represent the earlier by-products, but such an inference is dependent upon the type of raw material and core technology employed.

Tool production activities and flake removal requiring precise control tend to be associated with flakes with complex platforms. Specific activities can be inferred from individual flake types within this category. Angular flakes with complex platforms, with or without cortex, represent the attempt to produce specific shapes and sizes of flakes during the reduction process. These flakes are often used as tools or as tool blanks subsequently retouched into formal tools. Flat flakes with complex platforms, especially larger ones, are also produced for use as tools and further modification. Smaller flat flakes with complex platforms are indicative of bifacial tool production in its latter stages. Since the manufacture of chipped stone tools is a reductive process, flake size decreases as the process proceeds toward the finished product. Flat cortical flakes with complex platforms

can reveal the selection of cortical flakes as flake blanks, a trait often associated with the manufacture of tools from small glacial cobbles.

ANALYSIS

Site 1 (20BY167)

Site 1 at Clements Airport is represented by a single flake. It is an angular/blocky interior flake with an unprepared platform and is representative of the core reduction process rather than tool production. It weighs 5.6 grams and is 30 mm to 40 mm in maximum length.

Site 2 (20BY168)

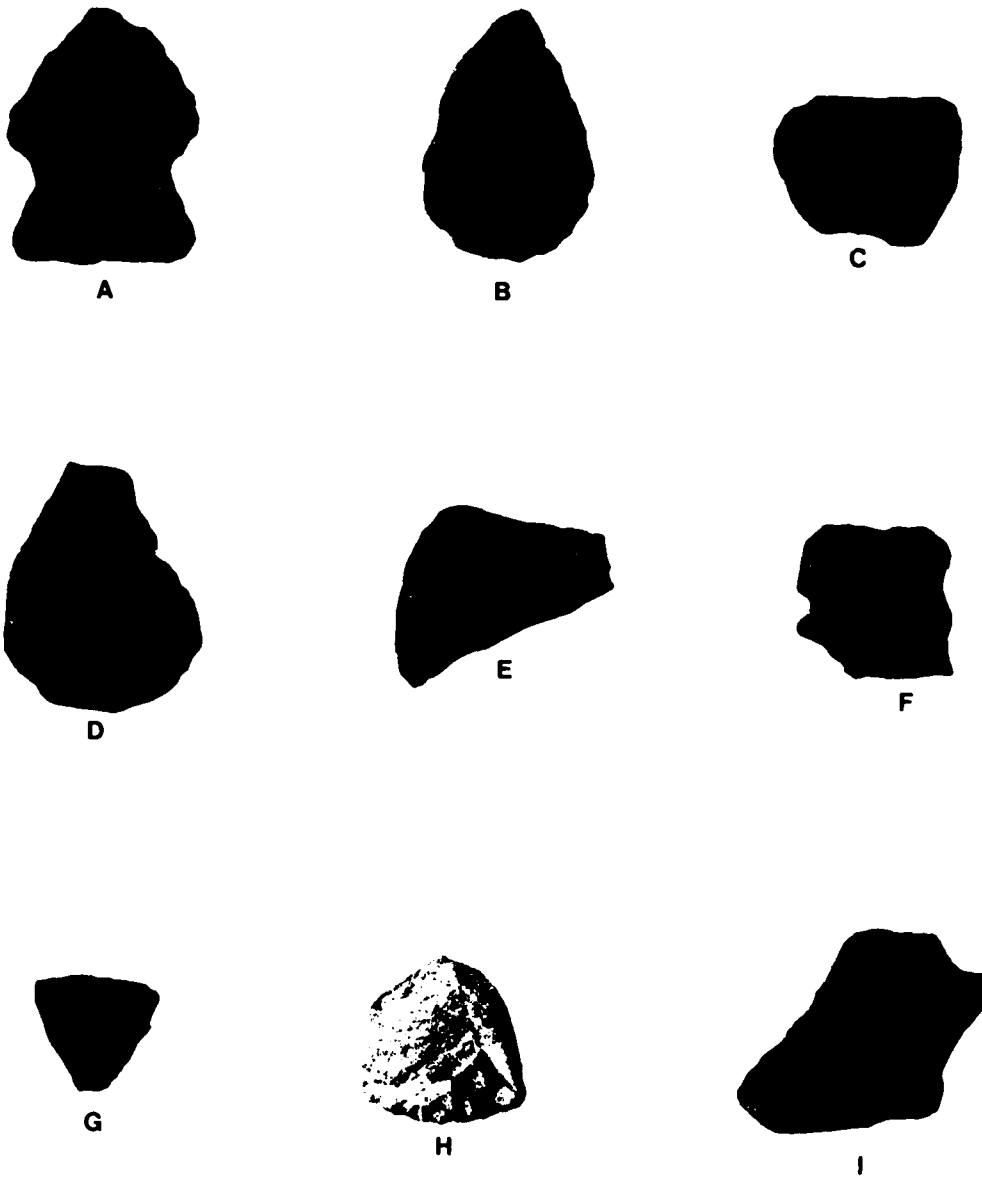
Site 2 at Clements Airport has the largest and most diverse archaeological assemblage. There are 30 pieces of fire-cracked rock weighing 1894.6 grams. Two of these have flat, possibly utilized facets, but they are too incomplete to warrant classification as ground stone tools. One fire-cracked cobble of olivine gabbro (?) weighing 95.5 grams was apparently used as a hammerstone. Although the proximal and distal ends of this oblong tool are missing, pecking is present on both lateral edges, with one edge showing evidence of greater use. This hammerstone fragment is 64.0 mm long, 47.6 mm wide, and 26.4 mm thick. In addition, four unmodified cobbles (CC Nos. 67, 72, 77, and 87), five naturally caused chert spalls (Test Unit 1/Level 1, Test Unit 1/Level 2, CC No. 22, CC No. 71, and NW Field), and a mammal bone fragment weighing 0.9 gram (CC No. 78) were collected.

Chipped Stone Tools

Projectile Points/Knives (Figure 5a)

A single projectile point/knife weighing 16.5 grams was recovered from site 2. Made from Bayport chert, it has a large, expanding stem which strongly contrasts with its short, broad blade. In cross-section, the blade is thick and bi-plano with short, steeply angled edges. This tool was evidently discarded after attempts to rework it failed. All edges have remnant ground areas which are not

FIGURE 5
ARTIFACTS
Intensive Archaeological Survey
James Clements Airport
Bay County, Michigan



Gilbert/Commonwealth Inc. of Michigan

related to hafting but to platform preparation for reworking. The blade is short and thick, and has deep flake scars where attempts were made to thin the blade. The lateral blade edges appear to have been too thick and steep to allow thinning; the flake scars failed to travel sufficiently beyond the immediate edge to result in thinning the blade. Another attempt was made from the base. Again, most flake scars terminate just beyond the edge, although one scar extends to the midpoint of the tool. Unfortunately, the extensive reworking of the blade makes comparisons with known types problematic. Further, the stem is unusually large and no reasonable parallels could be found in the published archaeological literature.

TABLE 1
PROJECTILE POINT/KNIFE DIMENSIONS

Attribute	Millimeters
Total Length	44.0
Blade Length	26.0
Blade Width	33.3
Thickness	10.6
Stem Length	18.0
Stem Width	24.4
Base Width	31.9

Ovate-Triangular Bifaces

There are two ovate-triangular bifaces in the assemblage. They are a generalized tool form that is found in both Archaic and Woodland contexts. Neither appears to be a "finished" tool or preform. One has an unmodified facet on the distal end of one edge where flaking was not attempted (Figure 5b). All but one lateral edge of the former tool were ground as well. The other has areas where unsuccessful attempts at thinning left a thick platform with overlapping hinged and step fractures. These features may have been unintentional or intentionally left to facilitate prehension.

Each of these tools has consecutive marginal retouch scars that may be from use or sharpening. On the tool with the ground base and lateral edge (Figure 5b), this retouch occurs on the opposite edge. The retouch is "unifacial" in the sense that scars occur on one aspect of the bifacial edge; the edge angle varies from 50

to 60 degrees. On the second tool, the retouch is restricted to the left and right lateral edges toward the distal or pointed end of the tool. The edge angle varies from 40 to 55 degrees along these areas.

Chipped Celts or Adzes

An unfinished celt or adze made from greywacke and the bit from a Bayport celt or adze were found at site 2. The unfinished specimen has a bifacial edge on the bit and extends a short distance along each lateral edge. One face is dominated by a single large scar that gives the tool a concave longitudinal cross-section. The other face is more extensively flaked, especially along one lateral edge. The butt is barely worked at all.

The bit fragment is completely rounded from heavy use. In size and form, this tool fragment bears a striking resemblance to a bit fragment found at the Feeheley site. Microwear analysis revealed that the tool was used to chop or adze wood (Robertson 1987:279-280). The primary difference is that the specimen from site 2 is much more heavily rounded.

Bifacially Retouched Flakes

Two angular fragments are bifacially retouched along at least one edge. Both are made from Bayport chert. One fragment has lamellar and scalar flake scars along the single remaining edge. The flake scars are limited to the edge margin; most invade the edge 3 mm or less. The second fragment has irregular, deep scalar scars with stepped terminations on the dorsal face of its right, lateral edge. The opposite face of this edge has shallow and intermittent scalar edge damage. The left lateral edge has a combination of deep scalar flake scars on the dorsal aspect and shallow scalar flake scars on the ventral aspect.

Pieces Esquillees

A classic, rectangularly shaped piece esquillee was found at site 2 (Figure 5c). Battering on the top platform produced flake scars primarily on one face. The bottom platform is partially sheared off, creating a medial concavity;

hinge and step fractures are present on each side of this area, but, unlike the top edge, they are located on the opposite face. The right lateral edge also has battering on the same face as the bottom edge, while the left lateral edge has shallow scalar and half-moon edge-damage scars on both faces. It is made from Bayport chert.

TABLE 2
BIFACES AND PIECES ESQUILLEES FROM SITE 2

Tool Type (I.D. No.)	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Material
Ovate-Triangular Biface (NW Field)	39.1	29.6	11.9	11.2	Bayport
Ovate-Triangular Biface (NW Field)	43.2	29.5	9.1	10.8	Bayport
Celt/Adze (CC No. 11)	115.0	68.0	42.8	427.1	Greywacke
Celt/Adze (TU1, L1)	28.6	55.6	8.7	8.6	Bayport
Bifacially Retouched Flake (TU1, L1)	25.2	18.2	4.7	2.6	Bayport
Bifacially Retouched Flake (CC No. 60)	38.8	30.7	10.4	10.6	Bayport
Piece Esquillee (NW Field)	27.0	32.4	8.0	7.5	Bayport

Endscrapers

An endscraper is made on a flat decortication flake of Norwood chert with a simple platform. The primary working edge is along the transverse and left disto-lateral edges. The edge is not extensively retouched and is characterized by short flake scars with stepped terminations on the dorsal face. The edge angle is 60 to 70 degrees. Reworking is evident by the presence of two small notches on the working edge. The notches bear deep scalar flake scars at a high angle to the edge.

Sidescrapers

There are three varieties of sidescrapers, all made from Bayport chert. The first is a double, convex sidescraper made on an angular cortical flake with a complex platform (Figure 5d). The dorsal aspect of the left lateral edge has invasive, expanding flake scars with hinge and step terminations. The scars are overlapping, especially on the very margin. The right lateral edge has a much greater curvature and is not as extensively retouched. Lamellar and shallow scalar flake scars predominate on the dorsal aspect. A slight curvature toward the distal end of this edge was straightened by removing two flakes from the ventral aspect. The former edge angle is 60-70 degrees and the latter, 45 degrees.

The style of this sidescraper is duplicated at the Feeheley site. In addition, the edge angle of the more convex edge is 45 degrees and the other edge 60 degrees, making this similarity even stronger. Microwear analysis demonstrated that this was a butchering tool (Robertson 1987:283-285).

The second sidescraper has a single, convex working edge and is made on an angular fragment (Figure 5e). The left lateral edge is carefully retouched on its dorsal face. Flake scars are of the shallow scalar type. Their thinness resulted in very delicate step terminations. The edge angle is 50 to 55 degrees. The proximal and distal edges of this tool are also modified for the purpose of hafting and/or prehension. Flaking is very steeply oriented, producing a complex series of step and hinge fractures on the dorsal face of the proximal edge and on the ventral face of the distal end. In addition, the distal edge is ground.

The third tool of this type is a straight, single sidescraper made on an angular, interior flake with a simple platform. The right lateral edge is the primary working edge and exhibits deep scalar flakes on its dorsal face. Small step fractures are superimposed toward its distal end. The edge angle increases from 60 degrees to almost 90 degrees at this corner. The transverse edge has been thinned on its dorsal aspect at this corner as well.

Notches

The two notches in the assemblage are made on angular flakes of Bayport chert with simple platforms; one is a cortical flake and the other an interior flake. The cortical flake has a single notch midway along its left lateral edge on its dorsal face. The distal portion of this edge exhibits consecutive shallow scalar edge damage primarily on the same face. The edge angle of the notch is about 35 degrees and the edge-damaged edge angle is about 30 degrees.

The second notch was created with steep scalar retouch. This retouch, on the ventral aspect, also continues distally. Both areas have edge angles between 75 and 85 degrees. It is possible that the notch was made to create the spur on the proximal end of the flake, but there is no other retouch to support this inference.

Denticulates

An angular, interior flake of Bayport chert with a simple platform has deep scalar retouch on its left lateral edge. The flake scars occur on the dorsal aspect and create slight denticulations. The edge angle varies from 50 to 75 degrees as a result.

A second flake, a very large, angular, cortical flake with a prepared platform, is also denticulated. Intermittent deep scalar flakes result in a denticulated left lateral edge. The flake scars are on the dorsal aspect, and the edge angle varies from 45 to 90 degrees. The right lateral edge is also retouched. There is a deep half-moon fracture in the center of this edge. To the proximal side of it is an edge with deep and shallow scalar flake scars on its dorsal face. The edge angle varies from 50 to 65 degrees. Below the half moon is an area of very irregular bifacial retouch or edge damage 29.4 mm long. Flake scars are of the deep scalar type.

Gravers

An angular, interior flake of heated Bayport chert has spurs at the left and right disto-lateral corners (Figure 5f). Retouch, producing concavities, is adjacent

to each spur on the lateral edges. Retouch is also present on the transverse edge adjacent to the spurs. Additional concavity near the proximal end of the flake was created by removing flakes from the ventral surface of the right lateral edge.

Unifacially Retouched Flakes

The first tool of this type is made on an angular, interior flake of Bayport chert with a complex platform. The pattern of retouch is also extremely complex. The proximal half of the right lateral edge has three differently retouched areas. There are two concave areas of deep scalar retouch, one with flake scars on the dorsal aspect and the other with scars on the ventral aspect. Both have edge angles of about 70 degrees. The distal half of this edge has continuous scalar flake scars on the ventral aspect and an edge angle of 50 to 60 degrees. The transverse edge is similarly retouched but on this dorsal aspect to an angle of 75 degrees. The proximal half of the right lateral edge is edge damaged with intermittent, shallow scalar flake scars. A third concavity with an edge angle of 65 degrees is located at the midpoint of this edge. Just below this is an area of deep scalar flake scars, resulting in a denticulated edge. The edge angle is 50 to 65 degrees.

The second unifacially retouched flake is made on an angular, cortical flake of Bayport chert with a simple platform. Heat treatment is suggested. Retouch along the right lateral and transverse edges results in a short, thick projection or "bec." Deep scalar and stepped flake scars predominate on both edges. The right lateral edge is sinuous and, although essentially unifacial, it does not have a few isolated flake scars on this ventral aspect. Intermittent edge damage is present on the left lateral edge.

The last formal tool is probably the distal fragment of a larger tool. A few scalar flake scars can be found on the dorsal aspect of both edges. Bipolar percussion applied to this fragment is suggested by opposed flake scars with stepped terminations on the dorsal aspect of the proximal end, and both aspects of the distal end. Like most tools in the assemblage, it is made from Bayport chert.

TABLE 3
UNIFACIAL TOOLS FROM SITE 2

Tool Type (I.D. No.)	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Material
Endscraper (NW Field)	32.2	29.9	5.5	4.8	Norwood
Sidescraper (NW Field)	41.7	35.2	5.8	5.8	Bayport
Sidescraper (CC No. 39)	32.0	36.6	8.2	7.4	Bayport
Sidescraper (NW Field)	33.4	27.7	6.6	5.5	Bayport
Notch (NW Field)	19.5	28.2	17.6	3.4	Bayport
Notch (NW Field)	29.0	21.7	5.1	2.4	Bayport
Denticulate (NW Field)	33.6	34.2	7.9	6.4	Bayport
Denticulate (CC No. 81)	69.0	35.4	7.6	16.9	Bayport
Graver (NW Field)	27.0	28.1	7.2	5.3	Bayport
Unifacially Retouched Flake (NW Field)	44.5	28.7	7.1	7.1	Bayport
Unifacially Retouched Flake (NW Field)	37.0	33.5	13.7	12.6	Bayport
Unifacially Retouched Flake (NW Field)	24.0	29.2	8.3	4.6	Bayport

Edge-damaged/Utilized Flakes

A total of nine edge-damaged/utilized flakes were recovered during the survey and test excavations at site 2. Rather than describe each flake, the relevant data pertaining to this class of artifact are presented in Tables 4 and 5.

TABLE 4
EDGE-DAMAGED/UTILIZED FLAKES FROM SITE 2

Flake Type (I.D. No.)	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Material
Angular, Interior Complex (NW Field)	32.6	26.0	6.3	4.2	Glacial
Flat, Interior Simple (NW Field)	29.4	21.4	4.8	2.5	Bayport
Angular, Interior Simple (NW Field)	20.6	23.3	5.5	2.8	Bayport
Angular, Cortical Simple (CC No. 44)	21.6	36.0	8.0	5.9	Bayport
Core Trimming (CC No. 49)	25.1	46.7	11.5	9.4	Bayport
Angular, Interior Fragment (CC No. 54)	23.6	30.4	6.0	3.3	Bayport
Angular, Cortical Fragment (CC No. 62)	35.7	34.0	8.6	8.7	Bayport
Flat, Cortical Fragment (TU1, L2)	26.3	14.6	4.7	1.3	Bayport
Angular, Interior Complex	32.0	31.4	8.8	6.5	Bayport

TABLE 5
LOCATION AND PRIMARY TYPE OF
EDGE-DAMAGE ON FLAKES FROM SITE 2

I.D. No.	Left Lateral	Right Lateral	Transverse
NW Field	Half-Moons		
NW Field	Half-Moons	Half-Moons	
NW Field	Half-Moons	Half-Moons	
CC No. 44			Half-Moons
CC No. 49			Half-Moons & Shallow Scalar
CC No. 54			Deep Scalar
CC No. 62	Deep Scalar		Shallow Scalar & Steps
TU1, L2		Shallow & Deep Scalar	
TU1, L2	Deep Scalar	Steps	

Chipped Stone Debitage

A total of 74 flakes weighing 277.2 grams were recovered from site 2. The vast majority of flakes, 94.6 percent (N=70) are made of Bayport chert. This is typical for debitage assemblages in this region during all time periods. Only a small number of Bayport flakes (N=14 or 20 percent) show evidence of having been exposed to heat. The four remaining flakes are made from unidentifiable glacial cherts.

The debitage profile for the site is offered in Table 6. Despite the small sample, the debitage profile is definitely skewed. The extremely low frequency of flat flakes with complex platforms (N=7 or 9.56 percent) suggests that bifacial tool production was not an important activity at this site. In contrast, core reduction and the production of angular flakes for use as tools or for modification into unifacial tools was the dominant manufacturing activity.

Angular flakes of all types and core trimming/platform rejuvenation flakes comprise 54.1 percent (N=44) of all flakes; only two of these have complex platforms.

TABLE 6
DEBITAGE PROFILE FOR SITE 2

Flake Type	Size (mm)	Weight (grams)	Count
Core Trimming/Platform Rejuvenation	0-10		
	10-20		
	20-30	2.7	1
	30-40	6.0	1
Angular Cortical Flakes with Simple Platforms	0-10		
	10-20		
	20-30	9.4	5
	30-40	21.0	5
	40-50	49.6	4
	50-60	52.9	3
Flat Cortical Flakes with Simple Platforms	0-10		
	10-20		
	20-30	5.6	3
Flat Cortical Flakes with Complex Platforms	0-10		
	10-20	0.8	1
	20-30		
	30-40	5.6	1
Angular Interior Flakes with Simple Platforms	0-10		
	10-20	1.8	2
	20-30	20.7	8
	30-40	35.0	5
Angular Interior Flakes with Complex Platforms	0-10		
	10-20		
	20-30	2.8	1
	30-40		
	40-50	6.3	1
Angular Interior Flake Fragments	0-10		
	10-20		
	20-30	8.5	3
	30-40	1.9	1

TABLE 6
DEBITAGE PROFILE FOR SITE 2
(Continued)

Flake Type	Size (mm)	Weight (grams)	Count
Flat Interior Flakes with Simple Platforms	0-10		
	10-20	2.2	5
	20-30	6.1	4
	30-40		
	40-50	5.7	1
Flat Interior Flakes with Complex Platforms	0-10		
	10-20	0.9	1
	20-30	0.5	1
	30-40	6.8	2
	40-50	5.5	1
Flat Interior Flake Fragments	0-10	0.2	1
	10-20	4.3	7
	20-30	4.8	4
	30-40	3.9	1
	40-50	11.3	1
TOTALS		277.2	74

The small sample of cores adds a measure of uncertainty about the nature of chert reduction. One is a bipolar core of the area-point variety (Binford and Quimby 1963) made from a fine-grained glacial chert (Figure 5g). The other is a multi-directional block core made from Bayport chert with no evidence of heat treatment. Only four flake scars, with four different orientations, are present. Judging from the large inclusion present on two faces and its size, it was discarded as "exhausted." Secondary use as a tool is possible on one lateral edge where a 15 mm area of crushed and stepped flake scars occur; this may also be a last effort to create a workable platform at this location. Core dimensions are given in Table 7.

TABLE 7
CORES FROM SITE 2

Core Type (I.D. No.)	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Material
Bipolar (TU1, L1)	19.2	17.6	18.8	6.3	Glacial
Block (NW Field)	50.9	46.2	24.8	54.1	Bayport

The two platform trimming/rejuvenation flakes offer a glimpse into the core technology at this site. Both flakes were driven off the core with the axis of percussion oriented toward the center of the core. This type of flake is seldom reported in the archaeological literature for the region. The technique found here, however, differs from that reported for the Early Late Woodland occupation of site 20BY77. At the latter site, platforms were rejuvenated by a lateral blow with the flake following the edge of the core (Robertson 1986:70,74).

Discussion

Stylistically, there is too little information in the chipped stone assemblage to assess the cultural affiliation of site 2. The projectile point/knife has been extensively reworked, and the haft element is not particularly diagnostic. A possible relationship to the Late Archaic Feeheley site is suggested by the chipped adze bit and the convex double sidescraper.

The elevation of Clements Airport site 2 (582.5 feet amsl) suggests that occupation could not have pre-dated the Algoma stage lake levels; otherwise one would expect the tools to have been reworked or water rolled. This means that only Woodland and very terminal Late Archaic occupations would have been possible. In support of the latter, terminal Late Archaic/Early Woodland occupations are known to have occurred at 20SA1 (Wright 1964:17-22) and the Fletcher site (Lovis 1985:160 and personal communication) at 581 feet amsl and about 583 feet amsl, respectively. Further, a Feeheley-related occupation is not out of the question. In a recent reassessment of Archaic chronological relationships in the Saginaw Valley region, Lovis and Robertson (1986) have argued that, among

others, a terminal Late Archaic occupation is strongly represented at the Feeheley site. Nevertheless, it is crucial that more testing be undertaken at site 2 before any decisions about its fate are decided.

The chipped stone assemblage also requires additional assessment. It suggests a rather sizeable occupation. Moreover, the chipped stone assemblage from site 2 is highly unusual. As discussed above, chert reduction activities appear to be geared toward the production of large, angular flakes for use as tools. This trend is supported by the frequencies of flake types observed for the unifacial tools, bifacially retouched flakes, and edge-damaged/utilized flakes. A total of 25 out of 26 of these artifacts are angular flakes or fragments (including one core trimming/platform rejuvenation flake). Of these, only six have prepared platforms. The predominance of tools with unifacial retouch (N=9) over bifacial tools (N=7), and the possibility that many flakes were utilized without formal modification, is suggestive of a rather conservative, but opportunistic use of raw materials.

Also consistent with this scenario is the extremely low debitage (including cores) to tool ratio (excluding edge-damaged/utilized flakes) of 4.47:1. Of all the excavated Woodland and Archaic sites in the region for which these data are available, only the Middle Archaic and Late Archaic occupations of the Weber I site, and the Late Archaic Feeheley site remotely approach this ratio (31:1, 27:1, 35:1, respectively) (in Robertson 1987:174). All other Archaic and Woodland sites, including Conservation Park, Schmidt, Schultz, 20BY77 and 20BY79, and Butterfield, exceed a debitage to tool ratio of 100:1 (based on Beld 1985; Fairchild 1977; Fitting 1972; Robertson 1986; Wobst 1968, respectively). In part, this can be attributed to the predominance of bifaces and biface manufacture at these other sites. Nevertheless, additional research is needed to identify the other variables responsible for the extremely low tool to debitage ratio and, it might be added, the diversity of unifacial tools.

Consequently, site 2, once its cultural affiliation is determined, could play a key role in understanding the relationships between chipped stone assemblages, site function, and settlement strategies. As Binford (1979) has pointed out, the particular way in which chert raw materials are utilized at a site can be related to any number of other variables depending upon the particular role this site played in

the subsistence-settlement system of which it was a part. Seasonality, site location, and the timing of site movements have been shown to play a crucial role in the presence or absence of activities at archaeological sites (Robertson 1987). Given the limited information at this time, the overall function of site 2 in the subsistence-settlement system of which it was a part is unknown. Only through further testing can enough information be retrieved to begin to answer the more theoretically and methodologically relevant questions pertaining to the analysis of settlement strategies and inter-assemblage variability.

Site 3 (20BY169)

Three items were recovered from site 3 at Clements Airport: two pieces of fire-cracked rock weighing 143.0 grams and one spall from a glacial cobble weighing 0.9 gram. This spall exhibits no attributes typical of flakes produced during the chert reduction process and may have been produced as a consequence of natural processes.

Site 4 (20BY170)

The artifacts from site 4 at Clements Airport include 20 fire-cracked rocks weighing 1532.6 grams, 9 flakes, 2 edge-damaged/utilized flakes, an endscraper, a sidescraper, and a naturally caused spall of glacial chert weighing 5.0 grams. One of the fire-cracked rocks may be a milling stone fragment, given the presence of an extremely flat facet on one side. Unfortunately, the small size of this artifact prevents any conclusive assessments.

Chipped Stone Tools

The endscraper is made from an angular interior flake of Norwood chert with a simple platform (Figure 5h). The transverse working edge is slightly convex and exhibits shallow lamellar and scalar flake scars. The retouch orientation is direct (scars on the dorsal aspect). The edge is moderately rounded and varies between 60 and 70 degrees. Hafting is suggested by abrupt, indirect (flake scars on the ventral aspect) retouch on the lateral edges and the proximal edge. These edges were also lightly ground. Tool dimensions and weight are found in Table 8.

The sidescraper is made on an angular cortical flake of Bayport chert with a simple platform (Figure 5i). Both the left lateral and transverse edges exhibit direct retouch. The tool axis runs at an angle from the flake's axis of percussion; hence, this is a canted variety of sidescraper. The transverse edge is straight, but curves toward the left distal-lateral corner. It has steep scalar retouch scars and an edge angle of 85 to 95 degrees. The left lateral edge is slightly concave, is characterized by very short, stepped flake scars, and has an edge angle of 65 to 75 degrees. Edge rounding is minimal.

TABLE 8
UNIFACIAL TOOLS FROM SITE 4

Tool Type (I.D. No.)	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Material
Endscraper (CC No. 11)	30.0	26.2	8.5	8.5	Norwood
Sidescraper (CC No. 35)	43.5	32.3	12.1	12.1	Bayport

Edge-damaged/Utilized Flakes

Two edge-damaged/utilized flakes were recovered from site 4 at Clements Airport. Metrics, raw material types, and the location and dominant type of edge-damage scars are listed in Tables 9 and 10. It should be noted that the flake scars of CC No. 21 are discolored, which may suggest that the edge-damage is post-depositional.

TABLE 9
EDGE-DAMAGED/UTILIZED FLAKES FROM SITE 4

Flake Type (I.D. No.)	Length (mm)	Width (mm)	Thickness (mm)	Weight (grams)	Material
Angular, Cortical Simple (CC No. 21)	44.6	35.7	15.9	19.4	Bayport
Flat, Interior Simple (CC No. 33)	25.9	21.5	3.0	1.5	Bayport

TABLE 10
LOCATION AND PRIMARY TYPE OF
EDGE-DAMAGE ON FLAKES FROM SITE 4

I. D. No.	Left Lateral	Right Lateral	Transverse
CC No. 21			Deep Scalar
CC No. 33	Half-Moons		

Chipped Stone Debitage

The debitage profile is given below in Table 11. All but one of the flat interior flakes with simple platforms were made of Bayport chert, two of which showed evidence of heating. The lone exception was made from an unidentifiable glacial chert. Given the small size of the assemblage, it is difficult to make inferences about the nature of reduction at the site.

TABLE 11
DEBITAGE PROFILE FOR SITE 4

Flake Type	Size (mm)	Weight (grams)	Count
Angular Cortical Flakes with Simple Platforms	0-10		
	10-20		
	20-30		
	30-40	4.3	1
	40-50	13.2	1
Angular Cortical Flake Fragments	0-10		
	10-20		
	20-30		
	30-40	4.3	1
Angular Interior Flakes with Simple Platforms	0-10		
	10-20		
	20-30	2.2	1
Angular Interior Flake Fragments	0-10		
	10-20		
	20-30		
	30-40	4.4	1
Flat Interior Flakes with Simple Platforms	0-10		
	10-20	0.9	1
	20-30	1.7	1

TABLE 11
DEBITAGE PROFILE FOR SITE 4

Flake Type	Size (mm)	Weight (grams)	Count
Flat Interior Flakes with Prepared Platforms	0-10		
	10-20		
	20-30		
	30-40	2.6	1
Flat Interior Flake Fragments	0-10		
	10-20	0.5	1
Totals		35.9	3

Discussion

Prehistoric Resources

The chipped stone assemblage from site 4 at Clements Airport is suggestive of a rather ephemeral occupation. Further testing at the site could produce information important to understanding the full range of prehistoric occupation in the Saginaw Valley.

James Clements Airport Administration Building

The James Clements Airport Administration Building is a primary structure within the airport complex (Figure 2), which is situated at the southern edge of Bay City. The airport setting is a mixture of farmland and rural development, although a trailer park is situated immediately adjacent to the complex. The components of the airport complex include paved and dirt runways, service roads, and six hangars and storage buildings built of wood, brick, and/or corrugated metal erected between 1928 and 1977. The setting of the Administration Building itself consists of landscaped lawns with mature trees and shrubs.

The Clements Airport Administration Building was designed by prominent Bay City architect Joseph C. Goddeyne, and was built by the Webber Construction Co., a local firm, between 1929 and 1930. The two-and-one-half-story, three-bay Georgian Revival style structure is built of red brick, features white Vermont

marble and wood trims, and is capped by a slate roof. The facade of the building features a projecting entry bay with Classically inspired pilasters and entablature. Brass plaques on either side of the door commemorate soldiers from the area who lost their lives in World War I. A Vermont marble band course separates the first and second floors, while a modillioned wood cornice caps the facade, and the roof line is broken by three pedimented dormers.

The building's interior features 10-foot ceilings, with 12-foot ceilings in the large sunken waiting room. This waiting room is amply appointed with glazed tile, paneled 7-1/2 foot walnut wainscoting, a ceiling displaying an elaborately dentilated and molded corniceline, and a large marble-enframed fireplace. Also present are three brass chandeliers and wall-mounted lighting fixtures donated by Mr. and Mrs. William Clements in honor of their son, a World War I casualty for whom the airport is named. A continuously remodeled second floor apartment serves as a residence for airport managers and their families.

The Clements Airport Administration Building is the only completely intact original structure at the complex, and is an important example of the history and development of air travel at Bay City. This airport was the site of the first air mail and regularly scheduled passenger service in the region. The Administration Building served as a residence for the airport's early managers, a training school for pilots in the area, a waiting room for passengers, and a billeting facility for military personnel in training. Only a single structure at the airport, a hangar built in 1928, which has been considerably altered, predates the Administration Building.

Because of its architectural significance, its association with people prominent in local history, its commemorative value to the community in recognizing sacrifices in World War I, and its direct relation to the history and development of flight and air travel in the Bay City area, the Clements Airport Administration Building was placed on the National Register of Historic Places.

CONCLUSIONS AND RECOMMENDATIONS

The archaeological research undertaken for the James Clements Airport Flood Control Project resulted in the recording of four areas containing cultural remains. Site 1 (20BY167) consisted of a single flake found in an agricultural field. Cultural material from site 3 (20BY169) consisted of pieces of fire-cracked rock and one spall from a glacial cobble. Neither of these two sites would meet the eligibility criteria for the National Register of Historic Places and should not be considered significant. Therefore, the proposed project will not have an adverse impact on these two sites.

The artifacts from site 4 (20BY170) include 20 pieces of fire-cracked rock, 9 flakes, 2 utilized flakes, an endscraper, and a sidescraper. As discussed in the Artifact Analysis section of this report, the chipped stone assemblage from site 4 is suggestive of a rather ephemeral occupation. It is possible that additional research at this site will produce significant information for a better understanding of the outstanding research questions for the Saginaw Valley. The artifacts collected, the systematic collection of the artifacts, and the precise recorded elevation on the site will be important additions to the growing knowledge of prehistoric utilization of the Saginaw Valley. Based on this information, it is recommended that this site be further tested to determine eligibility for inclusion on the National Register of Historic Places.

Site 2 (20BY168) on the airport property produced a large and diverse archaeological assemblage. It included 30 pieces of fire-cracked rock, a hammerstone, a projectile point/knife, bifaces, celts or adzes, bifacially retouched flakes, a piece esquillee, endscrapers, sidescrapers, notches, denticulates, gravers, unifacially retouched flakes, edge-damaged/utilized flakes, chipped stone debitage, and a mammal bone fragment. While there is insufficient information to assign a definite cultural affiliation for the site, the elevation at 582.5 feet amsl suggests that occupation could not have predated the Algoma stage lake level. This means that only Woodland and very terminal Late Archaic occupations would have been possible. Additional testing at this site is necessary in order to make a definite assessment of its cultural affiliation.

The chipped stone assemblage also requires additional assessment. The assemblage suggests a rather sizable occupation and appears to be unusual for the Saginaw Valley. Refer to the Artifact Analysis section of this report for a discussion of this.

Additional research at this site, including a determination of its cultural affiliation, could play a key role in understanding the relationships among chipped stone assemblages, site function, and settlement strategies in the Saginaw Valley. In addition, further testing at this site will provide needed information for addressing more theoretically and methodologically relevant questions pertaining to the analysis of settlement strategies and inter-assemblage variability.

At least a portion of this site will fall within the proposed 150-foot construction zone; see Figure 2 for a location of the site and an estimation of the construction zone. The exact distance between the site and the proposed dike is not known since the centerline of the structure was not known at the time of the survey. It would be difficult to avoid this site during construction because of its relatively small size and its nearness to the existing drain. Therefore, it is recommended that a Phase II investigation be undertaken at this site to determine its potential for meeting National Register of Historic Places criteria and to develop appropriate mitigative measures.

The Clements Administration Building is situated within the 150-foot-wide project corridor (Figure 2). Although the building will not be directly impacted by the erection of dikes, its setting will be altered by rearrangement of existing surface contours. Most disturbance will be of a temporary nature, caused by construction equipment, although a permanent indirect visual impact will be imposed by the proposed dike. The low earthen berm dike will be constructed at the extreme eastern edge of the Administration Building lot along an existing drain. The approaches to the building from the north, west, and south will be unaltered.

Construction of the dike, while altering the physical setting of this National Register property somewhat, will also serve to protect it from possible seasonal inundation. The dike's visual impact may be screened, if desired, by landscaping

and appropriate vegetation. In balance, the protection and preservation provided to the Clements Airport Administration Building by dike construction appear to outweigh the negative effects of the project. As such, it is recommended that the project proceed.

REFERENCES CITED

Beld, S. G.
1985 The Conservation Park Site (20GR33). In Radiocarbon Dating in Gratiot County, edited by Tracy Luke, pp. 1-203. Report on file, Michigan Bureau of History, Lansing.

Betts, A.
1977 An Experiment to Examine Some Effects of Agricultural Implements on Flints: Its Results and Implications. Unpublished B.A. report. University of London, Institute of Archaeology. Summary in the Institute of Archeology Bulletin 15 (1978).

Binford, L. R.
1979 Organization and Formation Processes: Looking at Curated Technologies. Journal of Anthropological Research 35(3):255-273.

Binford, Lewis R. and George I. Quimby
1963 Indian Sites and Chipped Stone Materials in the Northern Lake Michigan Area. Fieldiana: Anthropology 36(12):277-307.

Brashler, Janet and Margaret B. Holman
1985 Late Woodland Continuity and Change in the Saginaw Valley of Michigan. Arctic Anthropology 22(2):141-152.

Bullock, D. A., and Company
1896 County of Bay, Michigan: Maps, History, Illustrations and Statistics. Bay City.

Butterfield, George (Editor)
1918 Bay County, Past and Present. C. and J. Gregory, Bay City.

Dain, F. R.
1956 Every House a Frontier: Detroit's Economic Program, 1815 - 1825. Wayne State University Press, Detroit.

DeBow, J. D. B.
1853 The Seventh Census of the United States: 1850. Washington, D.C.

Deloria, V.
n.d. Treaties and Agreements of the Chippewa Indians. The Institute for the Development of Indian Law, Washington, D.C.

Dragoo, Don
1963 Mounds for the Dead: An Analysis of the Adena Culture. Annals of the Carnegie Museum 37.

Emmert, Darlene Gay
1963 The Indians of Shiawassee County. Michigan History 47(2):127-155.

Fairchild, J. D.
1977 The Schmidt Site: A Pre-Nippissing Village in the Saginaw Valley. Unpublished M.A. thesis, Western Michigan University, Kalamazoo.

Fitting, James E.
1965 Late Woodland Cultures of Southeastern Michigan. Anthropological Papers 24. Museum of Anthropology, University of Michigan, Ann Arbor.

1970 The Archaeology of Michigan. Doubleday and Co., Inc., New York.

1971 Scheduling in a Shared Environment: Late Period Land Use Patterns in the Saginaw Valley of Michigan. Ontario Archeology 10:36-41.

1972 The Schultz Site at Green Point: A Stratified Occupation Area in the Saginaw Valley of Michigan. Memoirs 4. Museum of Anthropology, University of Michigan, Ann Arbor.

1975 The Archaeology of Michigan. Cranbrook Institute of Science Bulletin 56.

Halsey, John R.
1976 The Bussinger Site: A Multicomponent Site in the Saginaw Valley of Michigan with a Review of Early Late Woodland Mortuary Complexes in the Northeast Woodlands. Ph.D. dissertation, University of North Carolina at Chapel Hill. University Microfilms, Ann Arbor.

1981 The Wayne Mortuary Complex: A New Chapter in Michigan's Prehistoric Past. Michigan History 65(5):17-23.

Hodge, F. W.
1912 Handbook of American Indians North of Mexico. Bureau of American Ethnology Bulletin 30. Washington, D.C.

James, E.
1830 A Narrative of the Adventures of John Tanner, U.S. Interpreter at Sault St. Marie, during 30 Years Residence among the Indians in the Interior of North America. Reprint (1956) by Ross and Haines Inc., Minneapolis.

Keeley, L. H.
1980 Experimental Determination of Stone Tool Uses. University of Chicago Press, Chicago.

Knudson, R.
1979 Inference and Imposition in Lithic Analysis. In Lithic Use-Wear Analysis, edited by B. Hayden, pp. 269-281. Academic Press, New York.

Lovis, William A.
1984 Drainage Evaluation and Its Effects on Archaic and Early Woodland Adaptation of the Saginaw Valley, Michigan. Ms. on file at Michigan State University, East Lansing.

1985 The Role of the Fletcher Site in the Woodland Adaptations of the Saginaw Drainage Basin. Arctic Anthropology 22(2):153-170.

(Editor)
1986 Archaeological Investigations at Sites 20BY77, 20BY78, and 20BY79, at the Third Street Bridge Replacement, Bay City, Michigan. Michigan State University, East Lansing.

Lovis, W. A. and J. A. Robertson
1986 Rethinking the Archaic Chronology of the Saginaw Valley, Michigan. Paper presented at the Midwest Archaeological Conference, Columbus, Ohio.

Mills, J. C.
1918 History of Saginaw County, Michigan. Seeman and Peters, Saginaw, Michigan.

Moss, Emily H.
1983 Some Comments on Edge-damage as a Factor in Functional Analysis of Stone Artifacts. Journal of Archaeological Science 10:231-242.

Newcomer, M. H.
1976 Spontaneous Retouch, edited by F. H. G. Engelen. 2nd International Symposium on Flint. Staringia 3:62-64.

O'Callaghan, E. B.
1855 Documents Relative to the Colonial History of the State of New York, Vol. 10. Weed, Parsons and Co., Albany.

Ozker, Doreen
1977 An Early Woodland Community at the Schultz Site, 20SA2, in the Saginaw Valley and the Nature of the Early Woodland Adaptation in the Great Lakes Region. Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.

1979 Report of Archaeological Survey of the Kovacs Site in Dryden Township, Lapeer County, Michigan. A limited distribution planning report prepared by the Division of Great Lakes, Museum of Anthropology, University of Michigan, Ann Arbor.

1982 An Early Woodland Community at the Schultz Site 20SA2 in the Saginaw Valley and the Nature of the Early Woodland Adaptation in the Great Lakes Region. Anthropological Papers 70. Museum of Anthropology, University of Michigan, Ann Arbor.

Prahl, E. J.
1983 An Archaeological Survey of the James Clements Airport Planned New Runway Construction. Caminos Associates, Linwood, Michigan.

Ritchie, William A.
1961 A Typology and Nomenclature for New York Projectile Points. New York State Museum and Science Service Bulletin 384.

Robertson, J. A.
1986 The Lithic Assemblages from 20BY77, 20BY78, and 20BY79, Bay City, Michigan. In Archaeological Investigations at Sites 20BY77, 20BY78, and 20BY79, at the Third Street Bridge Replacement, Bay City, Michigan, edited by W. A. Lovis, pp. 53-119. Report submitted to the City of Bay City, Michigan Department of Transportation, Michigan Department of State, Federal Highway Administration, U.S. Department of Transportation.

1987 Inter-assemblage Variability and Hunter-Gatherer Settlement Systems: A Perspective from the Saginaw Valley of Michigan. Unpublished Ph.D. dissertation, Department of Anthropology, Michigan State University, East Lansing.

Schoolcraft, H. R.
1857 History of the Indian Tribes of the United States. Reprinted by the Historical American Indian Press.

Snyder, Guy
1987 At James Clements Airport: Runway Construction Works Around Heavy Rains. Michigan Contractor and Builder (January 17).

Stamps, Richard B. and Richard Zurel
1980 A Pilot Survey of Archaeological Resources of Oakland County, Michigan. Working Papers in Archaeology, Technical Report Series 27. Oakland University, Oakland, Michigan.

Stapert, D.
1976 Some Natural Surface Modifications on Flint in the Netherlands. Palaeohistoria 18:8-41.

Struever, Stuart
1964 The Hopewell Interaction Sphere in Riverine - Western Great Lakes Culture History. In Hopewellian Studies, edited by Joseph R. Caldwell and Robert L. Hall. Illinois State Museum Scientific Papers 12:85-106.

1965 Middle Woodland Culture History in the Great Lakes Riverine Area. American Antiquity 31(2):211-223.

Thwaites, R. (Editor)
1902 The French Regime in Wisconsin I, 1634 - 1721. Wisconsin Historical Collections 16.

1908 The French Regime in Wisconsin III, 1743 - 1760, Wisconsin Historical Collections 18:1-222.

U.S. Department of State
1841 Compendium of the Enumeration of the Inhabitants and Statistics of the United States, Sixth Census (1840). Washington, D.C.

Vaughan, P. C.
1985 Use-Wear Analysis of Flaked Stone Tools. University of Arizona Press, Tuscon.

Verwyst C.
1892 Geographical Names in Wisconsin, Minnesota, and Michigan, Having a Chippewa Origin. Wisconsin Historical Collections 12:390-398.

White, Anta M.
1968 The Lithic Industries of the Illinois Valley in the Early and Middle Woodland Period. Anthropological Papers 32. Museum of Anthropology, University of Michigan, Ann Arbor.

Wobst, H. M.
1968 The Butterfield Site, 20BY29, Bay County, Michigan. In Contributions to Michigan Archaeology. Anthropological Papers 32. Museum of Anthropology, University of Michigan, Ann Arbor.

Wright, Henry T.
1964 A Transitional Archaic Campsite at Green Point (20SA1). The Michigan Archaeologist 10:17-22.

Yarnell, Richard Asa
1964 Aboriginal Relationship Between Cultural and Plant Life in the Upper Great Lakes Region. Anthropological Papers 25. Museum of Anthropology, University of Michigan, Ann Arbor.

END

DATE

FILMED

DTIC

JULY 88