ARCHEOLOGICAL INVESTIGATIONS OF THE ST. CROIX NATIONAL SCENIC RIVERWAY, MINNESOTA AND WISCONSIN

By

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ABSTRACT

ARCHEOLOGICAL INVESTIGATIONS OF THE
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During 1976-1979 the author conducted an Archeological Survey of the St. Croix National Scenic Riverway. The Phase I survey covered 20 percent of the Riverway and resulted in the location of 77 archeological localities containing 24 prehistoric components and 61 contained historic components. The Phase II survey provided an additional 40 percent survey of the Riverway. The Phase II survey located 60 additional archeological sites, 41 historic and 19 prehistoric. The Phase III survey completed the final 40 percent of the Riverway. A total of 80 additional sites were located, 61 historic and 20 prehistoric.

As a result of the survey nearly 100 percent of the riverway has been evaluated. The various phases are discussed and a cultural history is developed. In addition it is suggested that a 20 percent random survey stratified according to vegetation would provide the best predictor of the site population for the Riverway.

ACKNOWLEDGMENTS

The author wishes to acknowledge the following individuals and institutions for their help and cooperation throughout the course of this project. Dr. F. A. Calabrese and Dr. Mark Lynott of the National Park Service, Midwest Archeological Center provided contract administration for this project and were most cooperative throughout the project. Nancy and Alan Woolworth of the Minnesota Historical Society provided assistance during the early stages of the project in identifying historical sources. Mr. C. S. Demeter was most helpful in identifying the historic artifacts located and Dr. C. E. Larsen provided his expertise in understanding the geology of the St. Croix river valley.

A special recognition is given to Dr. Charles Cleland and Dr. William Lovis of the Museum at Michigan State University who reviewed several previous drafts of this project and provided considerable help and encouragement. The author would also like to recognize Dr. James Fitting, Principal Investigator and the management and staff of Commonwealth Associates Inc. of Jackson, Michigan.

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CHAPTER 1

INTRODUCTION

In 1968 the St. Croix River and one of its major tributaries, the Namekagon River, were designated as National Scenic and Recreational rivers. The area included in the designation consists of a 103 mile segment along the St. Croix River between the dam at Taylor's Falls, Minnesota and the dam near Gordon, Wisconsin and a 94 mile segment along the Namekagon River between Lake Namekagon and its confluence with the St. Croix River (Figure 1). The total area designated for the riverway is 62,844 acres. Large portions of the area are owned by the United States and administered by the National Park Service. Other significant portions are state owned or are currently being transferred from Northern States Power Company ownership to federal ownership. The Office of the National Scenic Riverway is also purchasing land from private owners. As lands are acquired in fee, they are developed for recreational use, particularly as picnic, camping and canoe landing areas.

On April 13, 1976, Commonwealth Associates Inc. received a request for proposal from the National Park Service, Midwest Archeological Center. A proposal (P46-2) entitled "An Archeological Survey of The St. Croix National Scenic Riverway" was prepared by Commonwealth Associates Inc.

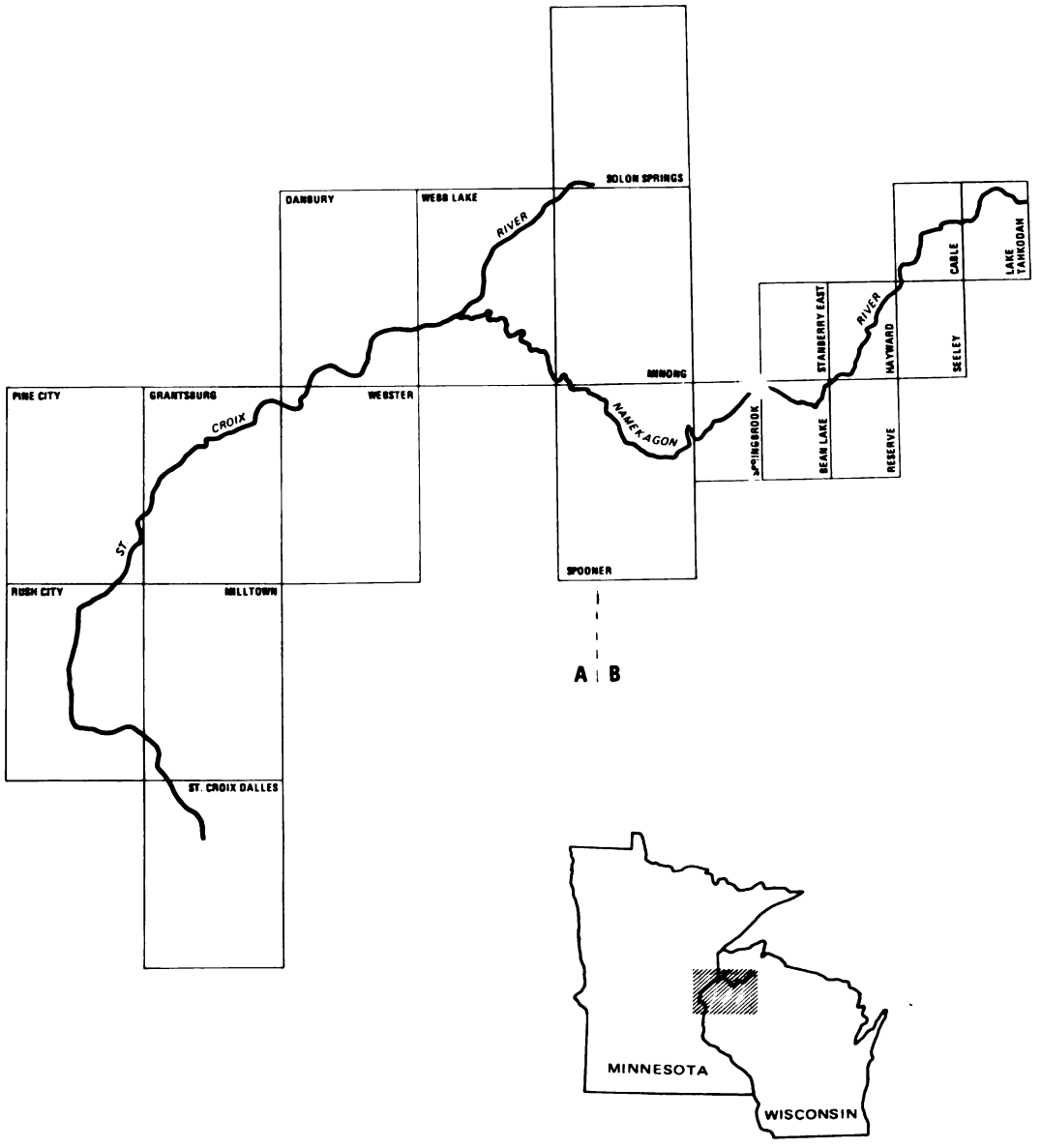


FIGURE 1

regional setting and index to U.S.G.S. topographic maps

and presented to the Midwest Archeological Center on May 10, 1976. Contract No. CX-6000-6-A060 for this project dated June 22, 1976, was received in the Commonwealth office on June 30, 1976.

The St. Croix project was designed to be accomplished in three separate phases to be undertaken during the field seasons of 1976, 1977, and 1978. Dr. James E. Fitting served as Principal Investigator until March, 1979 when he left Commonwealth Associates. The Phase I fieldwork was supervised by Ms. Candice H. Benn, all subsequent fieldwork was done under the direction of the author.

The major portions of the Phase I fieldwork were conducted between August 2 and 26, 1976. A second field effort was carried out between September 17 and 26, 1976. A 20 percent sample was taken of the riverway during Phase I. A total of 77 archeological sites were located and evaluated. These 77 sites contained 24 prehistoric components and 61 historic components.

The Phase II survey provided survey coverage of an additional 43 percent of the entire study area. This survey covered approximately 27,000 acres of the riverway. Sixty additional archeological sites were located and inventoried, 41 of these are considered historic and 19 prehistoric.

The Phase III survey was designed to survey the remaining 37 percent (23,497 acres) of the riverway to complete the sample. In actuality, only 36.9 percent was surveyed because access was denied on a number of properties. A total of 80 additional archeological sites were located for a total of 217 sites, of which 163 have historic components and 63 have prehistoric components.

The following sections discuss in summary form survey methodology, survey results and predictive model evaluation, based on all three phases of the study. One of the goals of this study is to evaluate sampling as a viable archeological planning technique. This study was undertaken within the constraints of a United States Government contract with all its inherent limitations.

A secondary goal of the project was to provide a basic cultural history of the Riverway, and to provide a preliminary cultural-ecological model for settlement along the riverway.

CHAPTER 2

ENVIRONMENTAL SETTING

GEOLOGY

The St. Croix River and its tributary, the Namekagon, lie within the Superior Upland, a subprovince of the Canadian Shield. This upland is related geologically to the Lake Superior Region, the framework of which was formed in Late Precambrian time when folding, faulting and outflow of lavas combined to form a synclinal basin. Subsequent filling of the basin by sandy sediments took place during the latest Precambrian and earliest Cambrian periods. Precambrian rocks underlie the major length of the St. Croix and Namekagon Rivers. These range in type from sandstones, shales and conglomerates in Washburn, Douglas and Bayfield Counties, to gabbros and basalt in Burnett County, Wisconsin. The lower few miles of the St. Croix Valley are underlain by Cambrian sandstone and shale. While these more resistant rocks are found outcropping along the riverbed, especially in Burnett County, the major contributor to the landscape has been glacial action.

An interplay between glacial ice lobes and glacial lakes has given rise to the present arrangements of the river systems. For example, northern Wisconsin and the Upper Peninsula of Michigan, as well as eastern Minnesota, have been affected by the Superior Lobe of the Late Wisconsin

continental glacier which advanced southwestward along the Lake Superior Basin. Central Minnesota, on the other hand, was more often affected by the Des Moines Lobe of ice which advanced from northwest to southeast. The existing glacial landforms in the project area belong to the Woodfordian and Greatlakean substages of the Wisconsin glaciation. Thus, the deposition of these sediments can be dated between ca. 20,000 and 11,000 B.P. During the past 11,000 years, dissection of the land surface has occurred in keeping with post glacial climates.

The St. Croix Valley, in particular, reflects the glacial history of the past 14,000 years. The river is confined to a broad trough, the Minneapolis Lowland, scoured out by the Superior Glacial Lobe which advanced into eastern Minnesota ca. 14,000 (Wright and Ruke 1965). Retreat of this lobe to the vicinity of Duluth and the readvance of the Des Moines Lobe across Minnesota at approximately 13,000 B.P. gave rise to an anomaly. While the movement of the Des Moines Lobe was dominantly from northwest to southeast, a small portion of the ice expanded into the preexisting lowland left by the Superior Lobe. Ice advanced to the northeast and up the lowland to the present town of Pine City, Wisconsin, where its maximum is marked by the Pine City Moraine. This glacial advance, identified as the Grantsburg Sublobe by Wright and Ruke (1965), was a major influence on the later environmental character of the area. For example,

meltwater from the Superior Lobe drained to the southwest into the Minneapolis Lowland where it was ponded behind the Pine City Moraine. The resulting glacial lake has been termed Lake Grantsburg. It received abundant clastic sediments from Superior Lobe meltwaters. Subsequent draining of the lake left a broad sandy plain referred to by Wright and Ruke (1965) as the Hinckley Sandplain. Most of the St. Croix River is confined to this sandplain.

The present channel of the St. Croix is also related to glacial advances and meltwater flow. Glacial ice retreated from Minnesota and Wisconsin by ca. 12,000 B.P., and spruce forest developed over much of Wisconsin. A later lobe of ice spread into the Lake Superior Basin about 11,800 B.P. This ice front seems to have extended a few miles south of the present shoreline of Lake Superior so that only portions of northwestern Wisconsin and the Upper Peninsula of Michigan were affected (Farrand 1969). The maximum extent of this ice front is marked by a sequence of end moraines in Douglas and Bayfield Counties.

Evenson et al. (1976) have referred to this later advance as the Greatlakean Substage. The melting, and concomitant retreat, of the ice front into the Lake Superior Basin gave rise to a series of pro-glacial lakes. The highest of these was glacial Lake Duluth, which attained an elevation of about 1008 feet. This elevation was sufficient to allow

lake water to overflow the recently deposited end moraines and to form two outlet channels. The westernmost drained to the Mississippi via the present Kettle River in Minnesota. The easternmost, and the outlet with the greatest longevity, was located at Solon Springs in Douglas County. Waters from this outlet eroded the present course of the St. Croix until new and lower outlets were opened to Lake Michigan by the rapidly retreating ice front. At this time, ca. 11,300 B.P. (Farrand 1969), the Solon Springs outlet ceased to function and the St. Croix River became dependent upon its own watershed for runoff. During the few hundred years that the St. Croix served as an outlet for Lake Duluth, it scoured a deep valley through basalt and various sedimentary rocks. While these are masked from view by later fluvial sediments over much of the area, the extent of erosion is still visible near St. Croix Falls where the river channel is sharply restricted by basalt outcrops (Chamberlin 1905).

In summary, the geologic processes that have combined to form the St. Croix Valley range from volcanic activity to glacial-fluvial agents. The area through which the river passes can be generally divided into three subareas. These are characterized first by uplands consisting of glacial end moraines, next by sandy lowlands which mark the extent of glacial lake beds and outwash plains and, finally, by surface exposures of erosion resistant Precambrian basalts. Uplands predominate in the headwaters of the St. Croix and Namekagon

Rivers. These are visible from the topographic maps of the area. Similarly they are reflected by soil type in Figures 2A and 2B where the Iron River, Gogebic, and Kennan soil types of Wisconsin relate to underlying poorly sorted glacial tills. This subarea also relates well to the extent of the Great Lakes Pine Forest shown in Figures 3A and 3B.

The sandy lowlands are equally well-defined. In Wisconsin this subarea is largely confined to Burnett and Polk Counties. The soil types, too, reflect the geologic history. Figure 2A shows that Omega, Vilas, and Hiawatha soils predominate in this zone. Here soils have developed on sandy outwash plains and glacio-lacustrine sediments. Once again, the vegetation reflects past deposition patterns. Sandy lowlands characteristically have maple-basswood forest cover (Figure 3A).

Finally, the resistant bedrock subarea is represented by the St. Croix Dalles, which separates Chisago County, Minnesota and Polk County, Wisconsin. This zone comprises only a small portion of the river system but provides much of the more spectacular scenery. It is less well-defined by vegetation type, or by soils. This is chiefly due to the presence of a blanket of glacial deposits which covers the near surface bedrock in the vicinity. Thus, soils and vegetation here more realistically reflect the overlying sediments.

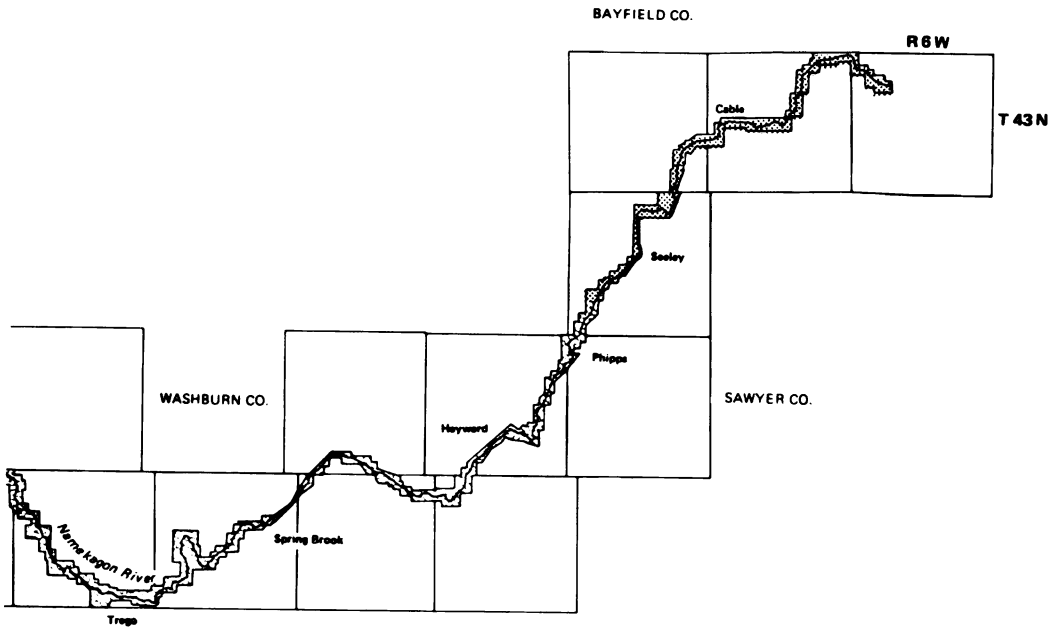


FIGURE 2-B

soil associations

Minnesota

- Hayden
- Milaca-Chetek
- Chetek-Onamia

Wisconsin

- Region F – Withee, Santiago, Amery, Antigo
- Region G – Iron River, Gogebic, Kennan
- Region H – Omega, Vilas, Hiawatha
- Region J – Pella, Newton, Houghton, Arenzville

NORTH

0 6 MILES

Source:
Arneman, H. F. Soils of Minnesota. University of Minnesota Agricultural Extension Service, Extension Bulletin 218, 1963.

Hole, F. D. et. al. Soil Regions of Wisconsin. University of Wisconsin Extension Geological and Natural History Survey, 1974.

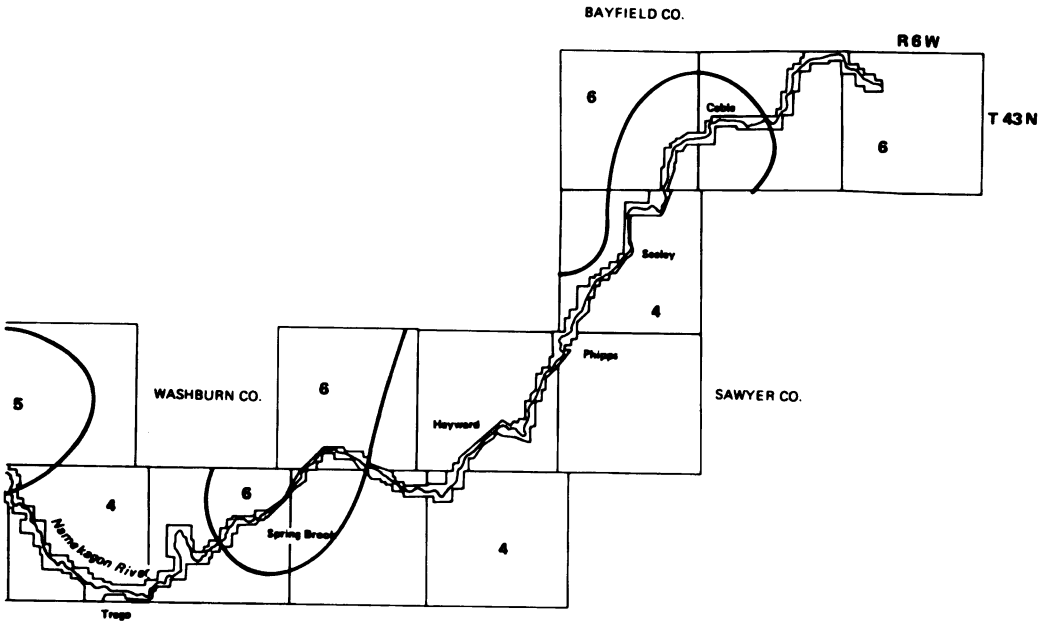


FIGURE 3-B

potential vegetation

1. Maple – Basswood Forest
2. Northern Floodplain Forest
3. Great Lakes Spruce Fir Forest
4. Great Lakes Pine Forest
5. Conifer Bog
6. Northern Hardwoods

NORTH

0 6 MILES

Source:
Kuchler, A. W. Potential Natural Vegetation of the Coterminous United States. American Geographical Society. Special Publication No. 36. 1964.

National Atlas of the United States Department of the Interior, Geological Survey, Washington, D.C.

SOILS

The parent materials for the soils from this region were deposited by the glacial activity in the area. Ice advancing to the southeast from the Keewatin Center passed over limestone deposits in southern Canada, picking up some of these contents as it moved. Material deposited by this glacial advance is usually calcareous. Ice advancing to the south from the Patrician Center passed over bedrock deposits of the Laurentian Shield. These deposits lack limestone, and material deposited by this glacial advance is noncalcareous. In addition, nonstratified tills and sorted outwash materials are deposited directly by glacial ice.

Three Minnesota soil associations and four Wisconsin soil associations are found within the St. Croix National Scenic Riverway (Figures 2A and 2B). The Minnesota soil associations are Hayden, Milaca-Chetek and Chetek-Onamia (Arneman 1963). The Wisconsin soil associations are Region F, Withee-Santiago-Amery-Antigo; Region G, Iron River-Gogebic-Kennan; Region H, Omega-Vilas-Hiawatha; and Region J, Pella-Newton-Arengville and Houghton muck (Hole 1974).

Due to the lack of available detailed soil mapping for the riverway, no attempt was made to determine equivalent soil associations for Wisconsin and Minnesota. For purposes of stratification each of the soil types were considered individually (See Chapter 5).

Descriptions of these seven associations are listed below:

Hayden - This is a light colored soil formed from calcareous loam or clay loam glacial till. It is well drained with a major erosion control problem. Major crops are legume hay, pasture, corn and oats.

Milaca-Chetek - These soils are found in a rolling to hilly area. They are light colored and well drained. Milaca has developed from noncalcareous stony and sandy loam till and Chetek from noncalcareous gravelly outwash. The vegetation found on these soils is primarily second growth aspen and oak.

Chetek-Onamia - These are light colored soils occurring in nearly level areas. They are formed on medium textured material overlying noncalcareous sand and gravel. The Chetek soils have developed to a depth of 18 inches, while Onamia soils are deeper. Vegetation common to these soils includes jack pine on the Chetek soils and aspen or scrub red oak on Onamia.

Region F - These soils are found in northern silty uplands and plains. Withee soils are poorly drained silt loam over acid, compact, stony loam till. Santiago and Amery are less extensive, well drained soils. Antigo soils are well drained, silty soils on plains of outwash sand and gravel. Fertilizers make this land productive for forage and small grain crops.

Region G - Iron River, Gogebic and Kennan are acid, stony sandy loams and loams of northern uplands and plains. They are characterized by irregular slopes, stoniness, with droughtiness on rises and wetness in depressions, and are not suitable for agriculture.

Region H - These soils have developed on northern sandy uplands and plains. The Omega, Vilas and Hiawatha soils of this region are reddish-brown sands. Lakes and bogs are numerous.

Region J - Soils of this type are associated with stream bottoms and major wetlands. Pella, Newton and Arenzville are mineral soils while Houghton muck, and others, are organic soils. There is a wide range of land use in the region

from wildlife habitat to vegetable crop production.

VEGETATION

Woodland vegetation covers a majority of the study area. Most of the area was heavily logged in the early twentieth century and present day forests consist of second growth pine and hardwoods. Only a few scattered remnants of the original white pine forests remain.

A smaller portion of the area, mostly located in the southern part of the riverway, south of Grantsburg, is characterized by areas cleared for cultivation and for pasture. These fields now lie abandoned and scrub brush and grasses predominate. The 1976 survey year was characterized by an unusually dry climate. Many swamps, which would normally be inaccessible, were dry with young regrowth forests already appearing.

Most species of terrestrial vegetation are associated with the Temperate Deciduous Forest Biome (Cushing 1965). Some species in the northern portion of the area are associated with the Coniferous Biome and species in the southwest section are associated with the Temperate Grassland Biome. Tamarack, white spruce, balsam fir and bog birch are found in the northern portions of the riverway. Needle grass and lead plant are found in the southwest (National Park Service 1976).

Kuchler (1964) describes five types of presettlement vegetation for the riverway area (Figures 3A and 3B). Maple-basswood and northern floodplain are broadleaf forests; Great Lakes pine and conifer bog are needleleaf forests; and northern hardwoods are a combination of broadleaf and needleleaf forests. Most of the riverway area is covered with Great Lake pine forest and maple-basswood forest. A more detailed description of each association is presented below:

Great Lakes pine forest - Dominant species are jack pine (Pinus bankasiana), red pine (Pinus resinosa) and white pine (Pinus strobus). The area is characterized by low to tall needle evergreens, often mixed with broadleaf deciduous trees and shrubs.

Conifer bog - Dominant species are larch (Larix laricina), black spruce (Picea mariana) and arbor vitae or white cedar (Thuja occidentalis). The area is characterized by dense to open, and low to medium tall needleleaf evergreen or deciduous trees.

Northern floodplain forests - Dominant species are cottonwood (Populus deltoides), black willow (Salix nigra) and American elm (Ulmus americana). The area is characterized by a low to tall and open to dense broadleaf deciduous forest.

Maple-basswood forest - Dominant species are sugar maple (Acer saccharum) and basswood (Tilia americana). The area is characterized by a medium tall, broadleaf deciduous forest.

Northern hardwoods - Dominant species are sugar maple (Acer saccharum), yellow birch (Betula alleghaniensis), beech (Fagus grandifolia) and hemlock (Tsuga canadensis). The area is characterized by tall, broadleaf deciduous forest mixed with needleleaf evergreen trees.

Some of the species which are popular food sources for inhabitants both in prehistoric times and today are wild rice, blackberries and cranberries. Wild rice grows in many of the flowages along the Namekagon River; cranberry bogs are also identified; and blackberries grow abundantly in many of the mixed hardwood forests. Details about the prehistoric and historic utilization of these food resources are discussed in the Prehistoric Background section.

BIOTIC PROVINCES

All of the Namekagon River, and the St. Croix River north from a point near Danbury, falls within the Canadian Biotic Province (Cushing 1965). This area is characterized by the mixed conifer-hardwoods forests described in the vegetation section of this report, the northern hardwoods, conifer bog and Great Lakes pine forests (Cleland 1966). The area is

characterized by Canadian province indicators such as the uneven topography caused by glaciation, moraines, sandy outwash plains, swamps and only a few rock outcrops. The soils, previously described, are light colored, acid, infertile, stony and sandy. The climate is cool, with the average annual temperature varying from 38 to 40 degrees Fahrenheit. The growing season lasts less than 120 days. The whole St. Croix Riverway averages about 29 to 34 inches of precipitation per year, with about 45 inches of snow fall (National Park Service 1976).

The southern portion of the St. Croix Riverway from St. Croix Falls to the Danbury vicinity is characterized by elements typical of the Carolinian biotic province, such as the predominance of maple-basswood forests and the number of frost free days increased to over 120 days per year. Soils in the area are also more suitable for cultivation.

CHAPTER 3

PREHISTORIC BACKGROUND

Prior to this research, very little information had been accumulated on the prehistoric period of the St. Croix Riverway. The purpose of this multi-staged study is to provide data on such resources along the riverway. This background report capsulizes the information as it existed before the 1976 survey. The following cultural history utilizes the temporal-cultural model of reconstruction. It should be viewed only as a general sequence of cultural stages with approximate temporal limits of each.

PALEO-INDIAN

Due to the presence of glacial activity in the area, it is assumed that human occupation did not begin until ca. 10,000 B.C.

The environment in which the Paleo-Indian existed was probably similar to that of a tundra or open boreal forest. The climate was generally colder and moister during this period of human occupation and forests consisted of spruce and fir. Within this environment, Paleohunters would most likely have found large and well populated species such as mammoth, giant beaver and elk. Cleland (1966) has stated that barren ground caribou was probably a major species exploited by the Paleo-Indians in the Great Lakes region.

The existence of Early Paleo-Indian people in the Upper Great Lakes is evidenced by the discovery of fluted lanceolate points as surface finds throughout the general area.

Clovis and Folsom fluted points, similar to those found in association with extinct ice age animals in the southwest, are the most characteristic artifacts of the Early Paleo-Indian period. No fluted point sites have been reported from the St. Croix and Namekagon riverways. However, they have been found in Wisconsin, in areas north of the study area. These glacial deposits were left by melting ice about 9,000 B.C.; thus, the recovered artifacts post-date that time (Quimby 1960). Fluted points dated later than 8,500 B.C. have also been found on the lake bed of glacial Lake Oshkosh.

Salzer (1974) has identified two separate and sequential phases which are both late Paleo-Indian. The Flambeau Phase is represented at three individual sites, Doering (47PR3), Gypsy Villa (47ON44), and Squirrel Dam (47ON21). The artifact assemblage of this Phase included long, unnotched projectile points with generally contracted lateral edges usually heavily ground near the base. Salzer considers these to be similar to the Agate Basin type (Wormington 1957). Salzer found these sites to be relatively small and possibly the result of habitation by a nuclear or

extended family. The second phase recognized by Salzer is the Minocqua Phase which is based on the excavation of a stratigraphically isolated component at the multicomponent Robinson site (47ON27) in the Lakes District of Wisconsin.

Minocqua phase sites are similar to those of the Flambeau phase in that they are small in size with small population size clearly indicated. The artifact assemblage from this phase includes a series of end and sidescrapers, large and small bifaces, bifacally worked flake knives, wedges, bipolar cores, and utilized flakes. In addition, a Wisconsin variant of a Scottsbluff projectile point is commonly found. The above classification utilized by Salzer should be considered tentative, little recent research has been undertaken to support his data.

Quimby (1960) refers to this latter period (7,000 to 4,500 B.C.) as the Aqua-Plano tradition with its characteristic utilization of unfluted lanceolate point type such as Scottsbluff, Plainview, Brown's Valley and Eden. Quimby also noted that these sites are generally found in association with fossil beaches and glacial and post glacial lakes. No sites of this type have been located along the riverway.

Toward the end of the Paleo-Indian period, fluctuating temperatures and changing floral and faunal resources combined to trigger a shift in the formerly successful big game hunting subsistence pattern. An influx of more pine

species followed the increasing warmer conditions. Technological and food gathering changes took place in response to the introduction of mixed deciduous and coniferous forest and to the related woodland animal species.

ARCHAIC

During the Archaic period there is evidence to indicate a continued warming trend called the altithermal climatic episode. During this time, the large Pleistocene mammals had become extinct and smaller woodland species were hunted in their place.

Around 5,000 B.C. there appears to be a change in the subsistence base which is reflected in the appearance of new forms of tools apparently fashioned for wood working and plant food preparation purposes. These tools, generally made of fine grained igneous stone, were pecked, ground and polished into mortars, pestles, adzes and axes.

The formalized patterning of the year into seasonal units which yielded specific resources was also taking place. Ultimately, distinct regional Archaic subsistence patterns arose. In the north, a hunting-gathering adaptation was still attuned to large mammals, but was accompanied by seasonal fishing. In the southern part of the region, the collection of wild food plants became an important aspect of the subsistence economy.

An extensive trade network, reaching from Lake Superior to the Gulf of Mexico, arose during the Late Archaic period. During this time, Lake Superior copper from Isle Royale and the Keweenaw Peninsula was mined and traded for exotic southern items. Locally, the use of certain exotic items in association with elaborate burial ceremonialism gave rise to regional Archaic complexes often referred to as the Old Copper (3,000 - 1,000 B.C.) and Red Ochre (2,000 - 500 B.C.) manifestations.

The Old Copper culture appeared in Wisconsin around 3,000 B.C. and was concentrated in the upper third of the state. However, one of the richest sites, the Osceola Site (Ritzenthaler 1946), is located on the Mississippi River in Grant County, Wisconsin. The Old Copper culture derives its name from the fact that great use was made of copper tools such as knives, awls, fishhooks, projectile points, adzes and axes, as well as ornaments. The native copper that exists in the Upper Great Lakes area, which was employed in the manufacture of these artifacts, was either cold hammered, or heated and hammered (Wittry 1957). Small copper deposits also occur along the Snake and Kettle Rivers. These were probably quarried by people living at Petaga Point, in Mille Lacs Kathio State Park, Minnesota (Bleed 1969).

The Osceola Site (Ritzenthaler 1946) was the first site discovered in which copper artifacts occurred in situ

along with other lithic artifacts in a mass burial. The burial technique employed here was that of the bundle burial, in which the body of the deceased was kept on a scaffold until the flesh had disintegrated. Later, the bones were gathered together and interred as a unit. The discovery of charred bones indicates that partial cremation was also practiced.

The Red Ochre culture, so named for the occurrence of burials capped with powdered red ochre, existed from 1,000 - 500 B.C. Burial sites are generally small, containing only a few individuals interred in a flexed position. These frequently occur in south-eastern Wisconsin. Small caches of turkey-tail points and long ceremonial blades, as well as large caches of ovate trianguloid knives and points, are often found in association with these burials.

Salzer (1974) reports two Archaic phases in North-Central Wisconsin. The first of these is called the Squirrel River Phase and is tentatively dated from 6,000 to 5,000 B.C. The artifact assemblage from this phase includes such diagnostics as small side-notched and corner-notched projectile points, gravers, spurred end-gravers, and large multipurpose bifacial tools. The second, the Burnt-Rollways Phase, is

dated between 2,000 B.C. and 1,000 B.C. Typical artifacts include small corner-notched expanding stem and small side-notched points.

WOODLAND

While basic subsistence and trade patterns continued, the manufacture of ceramics and domestication of plants are generally used to mark the beginning of the Woodland period.

The domestication of plants was dependent upon local growing conditions and, where climate prevented the intensive cultivation of plants, the Archaic subsistence patterns remained viable.

Early Woodland occupations appeared between 500 and 100 B.C. and the Middle Woodland lasted from around 100 B.C. to A.D. 500. Gibbon and Caine (1976) have identified the St. Croix Phase, a transitional cultural manifestation between Middle and Late Woodland, from A.D. 500 to A.D. 800. Salzer's 1974 report on the Wisconsin North Lakes Project combines Early and Middle Woodland occupations into what he calls the Nokomis Phase. This phase is marked by the appearance of small, crude, pottery vessels made of sandy clays and tempered with crushed granitic rock. These have slightly constricted necks and thick walls with square or flat lips. The entire surface is decorated with a paddle, wrapped with

predominantly S-twist cords. Over this base are horizontal rows of broad, finger-trailed lines. Other vessel forms occur with decorations consisting of cord marks, shallow punctates, dentate stamping and cord wrapped stick and string impressions. Some of the styles are similar to the Havana tradition vessels and those of the Black Sand Complex in Illinois. No specific projectile points were identified. Most of the points were made of exotic materials including cherts, silicified sandstone, Knife River chalcedony and a red chert from Barron County, Wisconsin. Other lithics in the assemblage included knives, and what appear to be projectile points worked into knives, endscrapers, sidescrapers, ovate plano-convex multiple purpose bifaces and drills.

A distinctive feature of the Nokomis Phase is the use of copper. The tool assemblage consists of awls, fishhooks, flat-stemmed projectile points, small chisels, punches, rolled beads and copper waste. Cairn-type hearths found at these sites supplied heat for the early metallurgists.

In general, the Early Middle Woodland in north-central Wisconsin reflects an increase in population, more intensive utilization of the area, heavier reliance upon trade and an important copper industry (Salzer 1974). Trade items appear to come from the south and east and possibly from the Laurel complex in northern Minnesota. In turn, copper tools are found in southern areas. Influence from the Hopewellian

cultures, with their major culture centers in the Central Mississippi, Ohio and Illinois river valleys, began spreading north and probably reached the Great Lakes area by 100 B.C.

Through time, there was an increasing involvement with the Hopewell Interaction Sphere, which was a widespread network of trade and burial ceremonialism (Caldwell 1964). This included construction of burial mounds, manufacture of ceremonial pottery and importation of exotic trade items such as obsidian from Wyoming, and shell ornaments from the Gulf of Mexico. Expanding from the Illinois Valley, the main migration route of Hopewell peoples into Wisconsin was up the Mississippi River. The duration of the Hopewell period is relatively short (100 B.C.-A.D. 500).

The abundance of information on Hopewell culture is derived from their conical mounds and related occupation sites. Hopewell art and material wealth was lavished upon the dead. Deceased persons of high rank were buried in subfloor pits, occasionally lined with logs or bark. Bodies were buried in an extended or flexed position with a diverse range of tools, utensils, pottery, pipes and other ceremonial objects. Conical mounds were erected over these grave pits. The elaborate nature of Hopewell ceremonialism is indicative of a social organization that included class structure, division of labor, and specialized artisans, as well as means

by which cooperative work projects like the construction of mounds could be organized.

After about A.D. 500, the influence of Hopewell culture had substantially diminished. Subsequent cultures seemed to have been diversified outgrowths of a more general Early and Middle Woodland base. The St. Croix Phase is described as a transitional phase between Middle and Late Woodland dated from A.D. 500 to A.D. 800 (Gibbon and Caine 1976). This phase has been identified from 22 excavated sites found between northwestern Wisconsin, and across eastern and central Minnesota to the Red River Valley. Fifteen of these sites are multicomponent habitation sites and several are single component burial sites. Most of the St. Croix Phase sites, excluding the burial sites, are found on streams near lake outlets. Some are found on points jutting into small lakes which have streams flowing through them or on the northern shores of lakes (Gibbon and Caine 1976). These locations are conducive to wild rice gathering, fishing and hunting waterfowl.

Diagnostic artifacts consist of well-made isosceles triangular and small side-notched projectile points. Pottery vessels have straight to slightly excurvate rims, unthickened lips, slight to moderate orifice constriction, moderate flaring in the body and subconical bases (Gibbon and Caine 1976). Cord roughening occurs on the body surface

and decorations are applied to the rim, consisting of bands of horizontal or oblique stamping applied with a dentate stamp, a comb stamp or a stick firmly wrapped with cord. The dentate stamping, general vessel shape and occurrence of exotic materials reflect carry-overs of Middle Woodland characteristics. The sites are larger, more frequent and have a greater range than earlier Middle Woodland sites.

The early Late Woodland culture has been dated from A.D. 800 to A.D. 1200 (Gibbon and Caine 1976) and includes two complexes: the Kathio Phase located within the southern boundary of the Carolinian-Canadian transition zone in eastern Minnesota, and the Blackduck Phase located north of the transition zone. Blackduck pottery is grit-tempered, cord-marked pottery with twisted cord or cord wrapped stick impressions. Both Kathio and Blackduck are associated with conical and linear mounds. Salzer reports that burial mounds are found in his study area for the first time during this period (Salzer 1974). Pottery described as Blackduck has been identified from the Lower Tamarack Village site along the St. Croix River (Streiff 1972). The people relied on hunting and gathering for subsistence with emphasis placed on gathering wild rice. Houses dated to this period indicate a degree of sedentism not found at earlier sites.

Mississippian sites, constituting a northern extension of the Mississippian culture, extended into Minnesota and

Wisconsin during this time. These settlements were few and were based on the cultivation of maize and beans. Blue Earth sites, a phase of the Mississippian, have been found along the Mississippi and St. Croix Rivers (Gibbon and Caine 1976) in the lower St. Croix area. To date, none have been identified in the upper St. Croix or Namekagon areas.

An Upper Mississippian cultural group appeared in Wisconsin around A.D. 800 and settled along the Mississippi River in the west and around Lake Winnebago in the east. This eastern group eventually had contact with Europeans in historic times, and have traditionally been identified with the Winnebago tribe (McKern and Ritzenthaler 1946). However, recent research by Mason (1976) has questioned this association.

A final migration of prehistiric peoples into Wisconsin took place around A.D. 1,000. This Middle Mississippian group probably moved north from the area of the Cahokia Mounds near East St. Louis, Illinois (Hurley 1975). Aztalan ceramics, projectile points, and other items are extremely similar to those from Cahokia Mounds. The village occupied a 21-acre area and was surrounded by a 12-foot high stockage with towers set at 80-foot intervals (Quimby 1960). The village was dominated by two large mounds fashioned in the form of truncated pyramids. The Middle Mississippian culture was based upon an agricultural economy supplemented by hunting and fishing.

The Middle Mississippian Aztalanians occupied a temporal position contemporary with the Effigy Mound culture which developed in Wisconsin about A.D. 800 and lasted until A.D. 1,300 (Hurley 1975). Effigy mounds are almost entirely limited to Wisconsin, occurring principally in the southern half of the state. The mounds are low mounds of earth, usually no less than four feet high and often several hundred feet long. They are shaped to represent various animals and birds, and occurred in groups of low circular and linear forms. The dead were placed in pits and covered by the mounds. In the animal and bird effigy mounds, the burials were placed at focal points such as the head or heart. Presumably, the effigy mounds bore a religious significance representing totem symbols or effigies of animals associated with various groupings of Indians (Rowe 1956).

During the Mississippian period, the Clam River culture also flourished near the St. Croix riverway (McKern 1963). This group similarly had elaborately prepared burial mounds and a subsistence economy that focused on hunting, gathering wild plants and, as implied by its name, intensive use of aquatic resources. The St. Croix river and its tributaries provided more than adequate large animals, aquatic fowl and wild rice to sustain good-sized settlements.

CHAPTER 4

HISTORICAL BACKGROUND

The period of initial European penetration into the western Lake Superior region dates to the opening of the seventeenth century. While Etienne Brule is generally credited as having been the first Frenchman to explore the area in 1623, he is probably only one of many unnamed traders and explorers who actually traversed the region prior to the establishment of French claim over the Great Lakes in 1669 (Dunn 1965). As early as 1658 Pierre Esprit Radisson and Medart Chouart Sieur de Groseilliers had entered the St. Croix area from Lake Superior and appear to have traded with the Santee Dakota or Eastern Sioux in the vicinity of the Snake River and Knife Lake (Brower 1901:119).

The first documented exploration into the interior area was made in 1679 by Daniel Greysolon Sieur du Lhut. He was assigned the task of attempting to make peace between the Dakota and Chippewa, and to search for minerals, furs and the source of the Mississippi. Du Lhut crossed into Duluth Bay (named after him), proceeded south, on the Brule River, crossed the Brule-St. Croix portage and continued down the St. Croix River to the Mississippi. He returned to Lake Superior by way of the Wisconsin-Fox River route. This is the earliest account of Europeans entering the St. Croix River area.

In 1683 du Lhut built a supply post, Fort St. Croix, at the portage route from Lake Superior to the Mississippi via the St. Croix River (Nute 1949). This would place it in the vicinity of modern day Solon Springs. It was the earliest fort in interior Wisconsin, but proved to be inaccessible to the Dakotas because of the invading Chippewa. In 1695 Pierre Charles Le Suer built a trading post for the Dakota on Prairie Island on the lower reaches of the Mississippi River. This established the St. Croix as a communication and supply route for trading posts throughout Minnesota. There are also references to a trading post built at Taylor's Falls in 1700, but research has failed to reveal its location (George 1973).

During this period Le Suer reported that the St. Croix was inhabited by the "Songasquitons", while the Bois Brule river was held by the "Ondebatons" or Ojibwa groups which were then entering the region (Brower 1900:92). Beginning in the mid-seventeenth century the Ojibwa began to move westward due to the pressure of Iroquois expansion in the east (Nesbit 1973). The encroachment of the Ojibwa into the St. Croix region fostered a conflict situation with the Dakota which lasted over a century and virtually eliminated any meaningful attempts on the part of the French to establish more than nominal control over the region's fur resources. Aided by the acquisition of French firearms,

the Ojibwa drove the Dakota out of both Mille Lacs in 1745 and Sunrise Prairie in 1745 (Brower 1900:82)(Nesbit 1973).

In 1767, four years after the cessation of the French and Indian War, a British expedition under Captain Jonathan Carver explored the St. Croix region. Among the Ojibwa settlements they encountered at that time were "Rice Village" on the Yellow River and another occupied by the "Stoney Creek" band to the south of Chippewa Lake. While Carver referred to the St. Croix in his map of 1769, the Bois Brule was identified as "Goddard's River" and the Namekagon as "Tute's Branch" or the "Copper Mine Branch" (Brower 1900). Several years after Carver's expedition passed through the area, the Dakota were driven from the St. Croix in a battle which took place at the portage of St. Croix Falls in 1770. While no longer able to maintain permanent settlements in the region, the Dakota continued to utilize the lands adjacent to the St. Croix for winter hunting (Neil n.d.:53).

A number of small trading operations were established along the upper St. Croix drainage during the late eighteenth century. These include a post occupied by Michael Cadotte on the Namekagon River between 1784-1785, and another operated by James Porlier during the winter of 1792-1793 at Taylor's Falls (Draper 1904).

In 1793 the Northwest Company of Montreal asserted its economic influence in the St. Croix region by building a post known as Fort St. Louis at Superior, Wisconsin. In 1796 Jonathan Sayer, the director of this establishment, had a secondary wintering post built at the mouth of the Yellow River (Hudson Bay Records, F Series). This remained the primary post for the supplying of the Folle Avoine district of the Northwest Company for the next ten years.

In 1807 the Yellow River post passed into the possession of the Southwest Company. Shortly after 1820 the American Fur Company occupied the post and continued to operate it until 1834 when a new post was built at Yellow Lake (Folson 1901).

In 1819 the Columbia Fur Company under Kenneth McKenzie built a four cabin complex to the south of Taylor's Falls, probably in what is now the Interstate Park. This post apparently was established primarily to trade with the St. Croix Chippewa at Minda's Village, called "Quailtown," at St. Croix Falls. The Columbia Fur Company was later absorbed (1827) by the American Fur Company (Taliaferro Papers: MHS). It was probably those buildings that Henry R. Schoolcraft and Captain James Allen burned on their expedition down the St. Croix in 1832. Schoolcraft and Allen noted the trading post and Indian village at the mouth

of the Yellow River and the Chippewa village at the mouth of the Snake River (Mason 1958).

The American Fur Company controlled the fur trade on the St. Croix until 1845. In 1837 the firm concluded a private treaty with the St. Croix Chippewa for all of the pine trees on the St. Croix and Snake rivers. Joseph Brown was sent to Taylor's Falls to direct logging and trading operations on the St. Croix in 1837-1838. He established a post on a creek to the south of Taylor's Falls and logged off the area around Clam Lake (Ryan 1976).

In 1837 the United States acquired most of the lands adjacent to and northwest of the St. Croix through the Treaty of St. Peters, which also established a reservation at Pokegema Lake for the Chippewa (Warren 1885). Before the treaty was ratified in Congress in 1838, John Boyce of Virginia began cutting lumber at the mouth of the Snake River. He was chased away by the Pokegema Band of the Chippewa but continued his operations at the mouth of the Kettle River in 1839 (Ryan 1976).

In the spring of 1838 Franklin Steele chartered the steamboat, Palmyra, and built a sawmill at the Falls of the St. Croix. He and his partners soon began logging the Snake River region (MHSC, 1905:648). In the fall of that year, Lewis Judd and David Hone arrived at St. Croix Falls

and poled their way by flat boat to the mouth of the Kettle River where they began logging operations. As members of the Judd Walker and Veazie Lumber Company, they also constructed a sawmill at Marine, Minnesota during the winter of 1838 (MHSC 1901:297-298). Within a year, Elam Greeley built a competing sawmill on the Sunrise River.

W. W. Spaulding began a cooperative effort with the American Fur Company in 1845 to dig copper from the glacial drift at the mouth of the Snake and Kettle Rivers. Another mine also was started north of Taylor's Falls by W.H.C. Folson, but no large ore deposits were ever located (Folson 1901).

In the 1850's the St. Croix Lumberman's Dam and Boom Company began to build log dams at the mouths of all major tributary streams along the St. Croix River. These dams held back the spring melt water until it was released to drive the logs over St. Croix Falls and to Stillwater for sawing. The main partners in this enterprise were Samuel McClure and Jacob Bean. The last dam was built at the mouth of Wolf Creek in 1868. In 1869 the St. Croix Dam and Boom Company turned its attention to building wooden dams across the St. Croix, Namekagon and Totogatic Rivers. In 1896 the company built its last dam on the American River in Wisconsin (Tozer n.d.).

In February of 1878 the Surveyor General of Minnesota visited logging camps on the Totogatic and Namekagon Rivers. Sauntry and Tozer; Judd, Walker and Veazie; G. Y. Johnson; Nelson and Long all had camps on the Totogatic River. Judd, Walker and Veazie and F. Jones had camps on the Namekagon River (WPA Records, MHS). The former concern, now designated as the Marine Company, built a town called Veazie on the Namekagon in 1877. Twenty miles below Riverside is St. John's landing, named after lumberjack Ed St. John, who organized the location as a gathering place for the lumberjacks who were working in the forest (Dunn 1965:277). Once the land was logged off, it was usually sold to farmers who were moving into the region.

In 1879 the firm of Hayward, Laird, Norton and Weyerhauser built their first log dam at NE 1/4, Section 26, T40, R7W. In 1881 the company was reorganized as the North Wisconsin Lumber Company. Two years later Anthony J. Hayward built a sawmill and a dam on the Namekagon river in Section 27, T41N, R9W. In 1885 he built a log dam above the small company town of Hayward. The Hayward area was later (1896) logged by the Knapp, Stout and Wilson Company of Menominee, Wisconsin as well (Dunn 1965).

During the 1870's John Martin and Issac Staples built a sawmill at Rusheba, Minnesota, and a cabin at Amador for

Staples's men (Cordes 1976)., In 1883 Staples built a log dam on Straight Creek in Polk County and began logging the Snake River region.

In 1873 the Socrates Nelson Lumber Company of Stillwater was purchased by Louis Torinius and William Chalmer. G. A. Torinius was logging on Totogatic Creek in 1887 and two years later W. Chalmers was reported to be logging on the Yellow River. By 1891 Chalmer's crew was operating at Spring Brook in Washburn County where he also built a log dam (Folson 1901).

During this period David Tozer and William Sauntry purchased extensive tracts along the St. Croix and the Namekagon which were exploited for their lumber resources. In 1891 Sauntry began logging the Tamarack River and built dams in Burnett and Douglas Counties. Four years later Sauntry and Musser also built a dam on the American River. Shortly after the turn of the century the Weyerhauser Companies purchased major holdings in several of these smaller logging companies, consolidating their control over the St. Croix regional economy. Musser-Sauntry Land Logging and Manufacturing Company, David Toser and Company, Kaiser and Williams and F. McKey sold their holdings in Douglas, Bayfield, Burnett and Washburn Counties in December of 1906. Within a month Weyerhauser had also purchased interest in land controlled by Laird's, Norton Company in the same counties.

Wooden logging dams and mills also were built by smaller logging companies. In 1875 Canute Anderson constructed his first sawmill and logging dam in Section 7, T38N, R19W, and ten years later he built a second dam on Wood Creek, Section 28, T38N, R18W. The Peterson brothers were reported to have built logging dams on Wood Creek in 1879 and on the Trade River in 1891. Frederick Peterson operated on the Trade River in 1887. Many other small companies operated in the region before the close of the logging era which occurred about 1915.

Many ghost towns existing in the vicinity of the St. Croix and Namekagon Rivers were built along roadways established in the 1850's. These include such places as Sunrise, Amador, and Rusheba. Others such as St. Croix, Randall and Stewart were located along railroad lines. In the 1880's the NPRR built a line to transport logs from Grantsburg to Stillwater. The Chicago, St. Paul, Minneapolis Railroad constructed a line in 1881 to Stinnett, later called Stewart, for the St. Croix Dam and Boom Company. The Soo Line Railroad crossed the St. Croix in T41N, R15 near the Second Mille Lacs Reservation.

Through the treaty concluded at La Pointe in 1854, the Chippewa relinquished their claim to all remaining lands on the St. Croix and its tributaries. However, by the 1870's a number of families, constituting what was to eventually

become known as the "Lost Tribe of the St. Croix," returned to the area and settled near the Lower Tamarack and Crooked Rivers. While they retained many traditional cultural patterns, the new socioeconomic conditions fostered by the logging industry had a definite impact upon their lives. Garden farming, hunting, trapping and fishing continued to be important economic activities, but many Chippewa also worked at logging camps, especially during the winter season.

In the 1870's some members of the "Lost Tribe of the St. Croix" intermarried with the Mille Lacs band and returned to the area in T41, R16 and R17 and continued to live along the St. Croix until 1934. At that time the Bureau of Indian Affairs organized six new reservations in six counties in Wisconsin for these "lost Chippewas" to live in. Many residences and cemeteries along the St. Croix River near the Lower Tamarack and Crooked Rivers belonged to these landless people.

With the coming of the railroads, many of the river towns were abandoned, with the exception of those tied to lumbering and ferry boat landings. A few ferry landings existed into the 1920's in some places along the St. Croix.

In the 1920's and 1930's private tree farmers and conservation groups began buying land along the St. Croix River. Counties purchased tracts for county forests and

parks and wayside parks were established by the State of Minnesota along the St. Croix and Namekagon. In 1935 the State of Minnesota took the first step which led to the formation of St. Croix State Park and Chengatona State Forest (Dunn, 1965:281).

Northern States Power Company has also purchased some of the land along the river in the last twenty years. The National Park Service, administering this newly designated wild and scenic river, has acquired much of the land along the St. Croix and Namekagon Rivers for public purposes. This land, which has undergone so many different types of exploitation, will thus revert at last to an appearance and use reminiscent of its historic past.

CHAPTER 5

SURVEY METHODOLOGY

Survey methodology for all three field seasons of the St. Croix project was designed to provide complete coverage of the Riverway (Figures 4A and B). The 1976 Phase I and 1977 Phase II methodologies were developed prior to the first field season. The 1978 Phase III methodology was developed in response to the first two field seasons. These adjustments were minor in nature and will be discussed later in this chapter.

Prior to the Phase I survey, the entire study area was divided into seven soil associations (Hole et al. 1974 and Arnemin 1963), five vegetation types (Kuchler 1964) and two climatic zones (National Atlas 1970). These variables were found to overlap into 18 different environmental subregions (Table 1). Chapter 2 presents a detailed breakdown of each of the soil, vegetation and climatic zones.

The Phase I survey consisted of a 20 percent survey of the Riverway.

The objective of the Phase II study was to survey each of the identified environmental subunits, ultimately

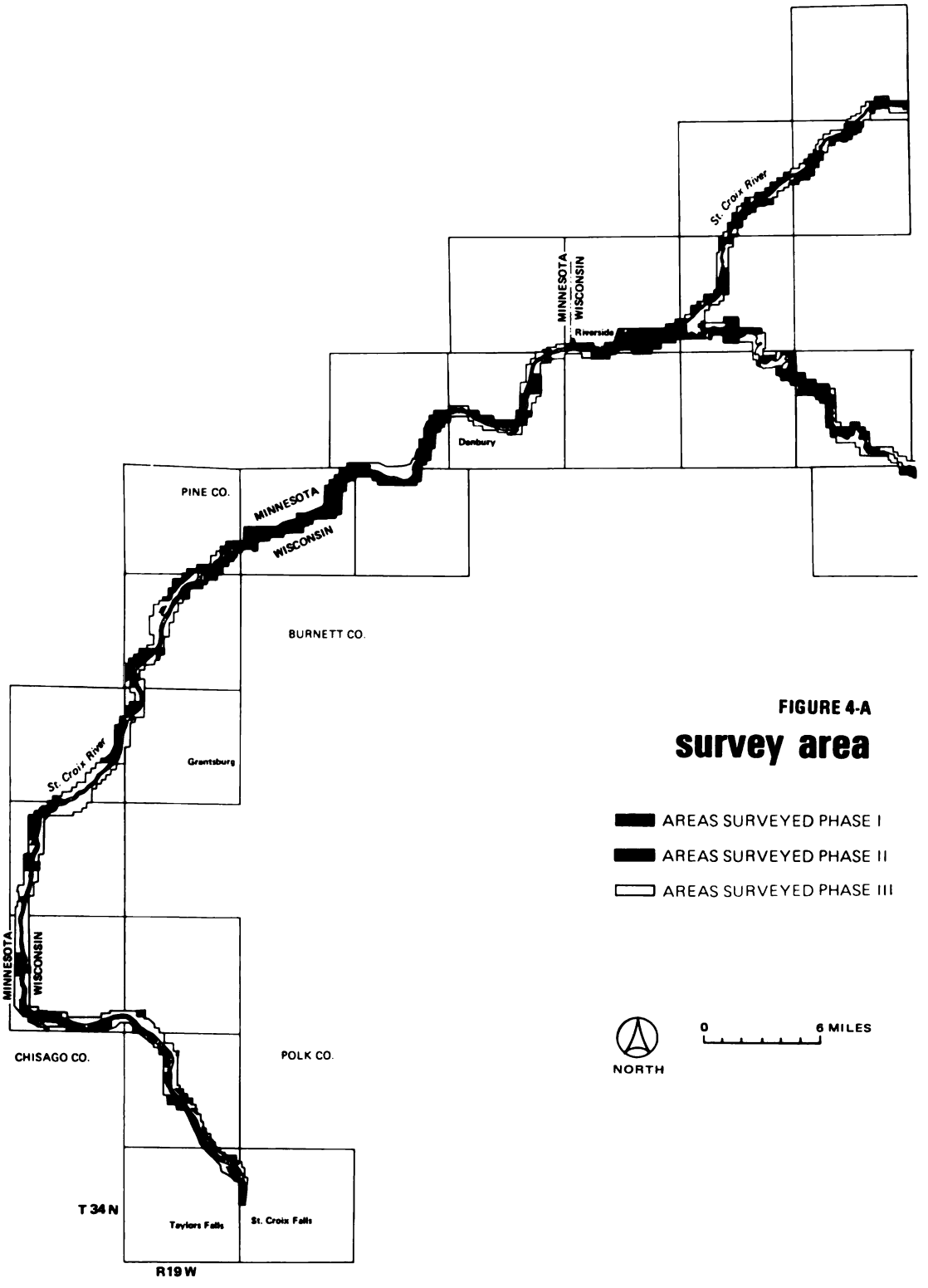


FIGURE 4-A

survey area

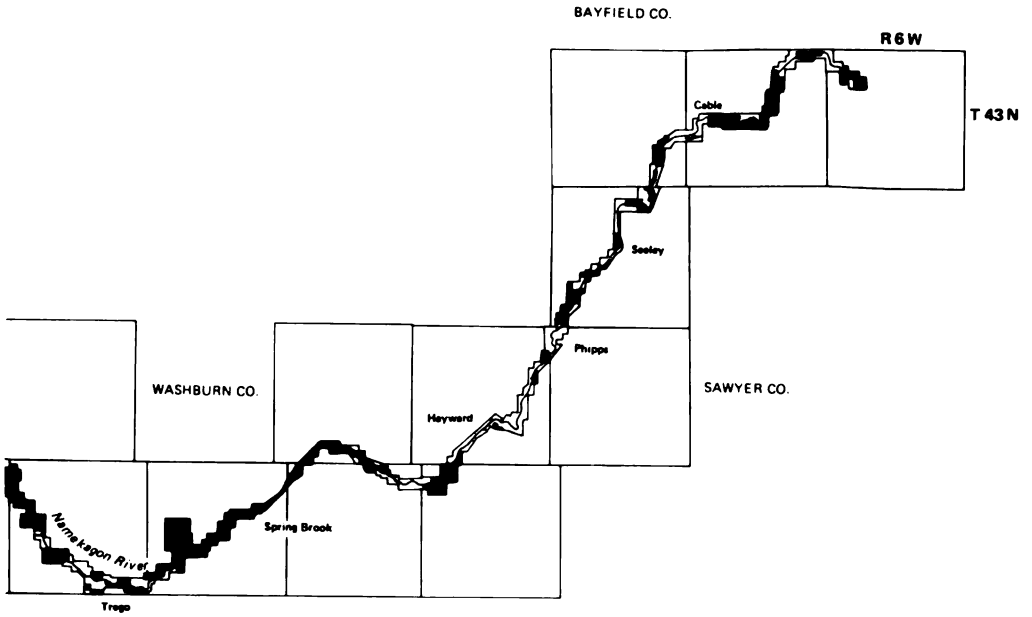


FIGURE 4-B

survey area

AREAS SURVEYED PHASE I

AREAS SURVEYED PHASE II

AREAS SURVEYED PHASE III

NORTH

0 6 MILES

TABLE 1
SURVEY SUMMARY

Environmental Subregion	No. Total Acres	1976 No. Acres Surveyed	1977 No. Acres Surveyed	1978 No. Acres Surveyed	Total No. Acres Surveyed	Percent Surveyed	1976 No. of Sites	1977 No. of Sites	1978 No. of Sites	Total No. of Sites	Site No. Acres Surveyed
1	2,203	622	777	804	2,203	100%	1	0	2	3	.0013
2	19,393	5,177	6,491	7,523	19,191	99%	21	17	26	64	.0033
3	9,652	1,909	3,938	3,729	9,776	99%	15	14	13	42	.0042
4	1,926	486	983	475	1,926	100%	2	6	1	9	.0046
5	2,969	641	1,364	964	2,969	100%	1	2	1	4	.0013
6	477	63	270	144	477	100%	0	0	0	0	0
7	2,233	266	1,316	651	2,233	100%	2	0	0	2	.0009
8	2,291	111	1,269	911	2,291	100%	4	0	0	4	.0017
9	5,056	584	2,452	2,020	5,056	100%	1	1	4	6	.0012
10	2,844	489	1,271	1,084	2,844	100%	7	3	2	12	.0042
11	1,142	175	967	-	1,142	100%	1	0	4	5	.0043
12	2,776	228	1,458	1,090	2,776	100%	3	2	5	10	.0036
13	3,089	653	1,218	1,218	3,089	100%	7	2	13	22	.0071
14	1,908	216	931	761	1,908	100%	2	4	3	9	.0047
15	2,526	493	1,053	980	2,526	100%	8	8	0	16	.0063
16	1,200	211	512	477	1,200	100%	1	1	2	4	.0033
17	479	79	216	184	479	100%	0	0	1	1	.0020
18	680	182	280	218	680	100%	1	0	3	4	.0059
Totals	62,844	12,585	26,766	23,233	62,566	99.5%	77	60	80	217	.0035

surveying approximately an additional 40 percent of the entire St. Croix Riverway. This survey was undertaken in such a manner as to provide a uniform 60 percent survey of each of the identified subunits.

The Phase III survey was designed to survey the remaining 37 percent, 23,494 acres of Riverway. In actuality, only 36.9 percent was surveyed because access was denied on a number of properties. A total of 80 additional archeological sites were located for a total of 217 sites for the Riverway (Appendices A and B).

During each of the three phases of the project survey areas had to be adjusted to access availability, and permission to survey on as much land as possible was acquired before each phase was undertaken. These lands included those held in ownership or easement by the National Park Service, those in ownership by Northern States Power, those in private ownership where permission to survey was given, and those lands owned by the State of Minnesota and Wisconsin where prior authorization was received. At the time of the 1976 survey the Riverway was comprised of a total of 62,844.18 acres. Of this total, 15,167.80 acres are publicly owned, 22,732.11 acres will be donated by Northern States Power

Company, and 47,676.38 acres are privately owned. Throughout the project, the latter was being acquired and status was being converted from private to public ownership. Permission to survey those acres still owned by Northern States Power was given by Mr. Jerry Anderson of that company. No permit was required for permission to survey land owned by the State of Minnesota. This land, as well as all land already acquired by the National Park Service from private ownership, was also accessible.

The State of Wisconsin requires permits for archeological survey on any state-owned land. Prior to each phase of the project, segment maps were checked and Wisconsin state-owned land was selected for survey. Applications for permits to survey forms were completed and submitted to Dr. Joan Freeman, State Archeologist. Permission to survey the remaining acreage was obtained from private landowners during the field surveys.

Base maps for the survey consisted of 1 inch = 660 feet, segment maps provided by the Superintendent of the St. Croix National Scenic Riverway and 7-1/2 and 15 minute USGS topographic maps. These maps were used to identify sample areas and ownership. In addition, the maps were used to plot all site locations.

The actual field survey was undertaken in three phases. Phase I was undertaken between August and September of 1976. This consisted of two sessions. The first session occurred during August and consisted of four archeologists working in teams of two. Each team consisted of one individual with specific background specialization in prehistory and one in history. During the August session, field headquarters was established at Trego, Wisconsin. From this centrally located base, one team surveyed the Namekagon Riverway from Namekagon Lake west to Trego. The second team surveyed the Namekagon Riverway, from Trego, west to its confluence with the St. Croix River, and along the St. Croix River from Gordon to Grantsburg, Wisconsin. During the second session, which occurred in September, only one team conducted field work. Field headquarters were established at Balsam Lake, Wisconsin, and the party surveyed portions of the St. Croix Riverway from St. Croix Falls to Grantsburg, Wisconsin. During this survey, each team was fully equipped with a field vehicle and other necessary field equipment.

The objective of the 1976 Phase I study was to relocate all previously reported sites and to survey 20 percent of each major subregion identified from environmental variables described in the background studies. Site descriptions for 26 archeological sites identified in

the listing of classified structures were furnished by the Midwest Archeological Center, National Park Service. Each of these identified sites was visited during the course of the survey.

If the site could not be relocated, attempts were made to check locations with local informants. Only sites which could be identified in the field were inventoried. The state site files were checked and recent additions to the files were added to the list of known sites to be field checked. In addition, three local informants who maintain an inventory of archeological sites in the riverway were contacted. Brad Keshlear and Arnie Long are both National Park Service rangers. Each, through their own interests and initiative, has compiled a list of sites, most of them historical, that exist within the riverway. Mr. Eldon Marple is a local historian, recognized locally for his expertise and publications on the history of the Namekagon River area. Mr. Marple shared his information with us and provided additional site locations which were also field checked. All sites identified by other informants, such as property owners and park personnel, were field checked.

Each site, whether it was a relocated known site or a site discovered during the survey, was inventoried

in the same manner. Sites were identified by either the presence of material on the surface, occurrence of features or other unnatural disturbances, or if substantial documentation described a site in an area where no cultural materials or surface features were observed. An example of this last category is the Sioux-Chippewa battle site two miles north of St. Croix Falls, which is documented by state site records and a historical marker.

If ground cover prevented visibility, a one by one foot square shovel test was dug every 50 meters along compass transects to locate the site. When materials or features were found, one by one foot test pits were dug in all four cardinal directions from the highest concentration of artifacts. These test pits were extended laterally until cultural material was no longer visible. An archeological site form was completed, photographs were taken, and diagnostic artifacts and lithic debris were collected.

The archeological site numbering system was based on ownership tracts mapped on the segment maps. For example, 18-117-2 refers to the second site found in Tract 117 (ownership and size in acres are listed on each segment map) on segment map Number 18. This system was designed to facilitate locating sites on the maps, adding new sites in sequence and checking on ownership status with the St. Croix National Scenic Riverway office in St. Croix Falls, Wisconsin.

The Phase I survey area was surveyed at 50 meter intervals. Each person surveyed 50 meters apart, digging a one by one foot test pit every 50 meters in areas of poor ground visibility. In wooded areas, compass transects were employed. All open areas such as roads, trails, tree falls and stream banks were also checked. When a site was found, it was inventoried as previously described.

Field conditions for the 1976 field survey were unusually dry. This proved to be beneficial, as swampy areas, which are usually too wet to survey, were dry and accessible. The water level in the St. Croix and Namekagon Rivers was far below average and features associated with logging activities were easily visible. Wing dams, remains of log dams, sluices of water mills and bridge footings were all easily identified. The low water levels did restrict canoeing activities in some areas which were more easily accessible by water than by roads.

The Phase II field survey was undertaken between July 25, 1977 and August 30, 1977. The six-person field team consisted of three two-person field parties, each consisting of a prehistoric and historic site specialist. Each separate survey team was fully equipped with a field vehicle and all necessary field equipment. In addition, the survey was split into two subphases, the first of which concentrated on the riverway north of the bridge at Grantsburg. During

this subphase the field team was headquartered at the town of Trego, which served as a central field office from which daily team efforts were coordinated.

The area north of Grantsburg was divided into approximately three equal subdivisions. These correspond roughly with: 1) the Namekagon River from Trego northeast to Namekagon Lake, 2) the Namekagon River west to the confluence with the St. Croix River and the St. Croix River from Riverside northeast to the dam at Gordon, and 3) the St. Croix River from the bridge at Grantsburg northeast to Riverside. Each field team was assigned one of these subdivisions and concentrated its daily survey efforts within it. It was found that this greatly facilitated the survey effort by allowing each field team to become extremely familiar with the survey area assigned to it. This resulted in a substantial saving in the time necessary to locate survey areas and allowed each field team to become familiar with local individuals who were extremely helpful during the course of the survey.

The second subphase of the Phase II field survey concentrated on the St. Croix River from St. Croix Falls north to the bridge at Grantsburg. During this subphase the survey team maintained a field headquarters in the town of Taylor's Falls from which daily field activities were coordinated. For ease and economy of the survey, the area from

St. Croix Falls to the Bridge at Grantsburg was divided into approximately two equal survey units. A field team was assigned to each of these units and concentrated its survey efforts within it. Actual field techniques were similar to those described above for the Phase I survey.

For each archeological site located, a Commonwealth archeological site form was completed, and black and white photographs were taken. This material is now on file at the Midwest Archeological Center, Lincoln, Nebraska. Each site located was plotted on both USGS topographic maps and NPS segment maps. Where cultural material was present, a collection was made of diagnostic material for later analysis at the archeology laboratory at Commonwealth Associates.

The archeological site numbers used during the Phase II survey were consistent with those used during the 1976 Phase I survey.

In addition, during the Phase II survey, a state site number was assigned to both the sites located during Phase I and those located during the Phase II portions of the project (Appendix A).

Field conditions during the 1977 Phase II survey had several effects on the methods and techniques employed during the survey. Weather conditions were extremely wet as opposed to the Phase I survey when conditions were very

dry. While this made surveying in the woodland environment extremely uncomfortable, it did not affect the actual survey. However, the survey was affected by the July 4, 1977 storm that hit the area of the St. Croix and Namekagon Rivers. This storm resulted in the uprooting of numerous trees which made access and survey in certain areas extremely difficult. For example, in the areas of the St. Croix Park, survey had to be abandoned because of the difficulty in locating sample areas and, if areas could be located, the difficulty of shovel testing when 70 to 80 percent of the trees were down. While these problems may have biased our samples in favor of areas more easily accessible, we were still able to adequately sample all 18 environmental subunits.

The Phase II survey was undertaken during July and August, 1978. As with the Phase II survey, the Phase III study was done with a six person field team which consisted of three two-person field parties, each consisting of a prehistoric and historic site specialist. Consistent with the previous study, the survey was split into two subphases. (See the description for the Phase II methodology for a detailed breakdown of the survey area.)

Actual field techniques employed were modified somewhat to take into consideration the results of the two previous phases and to reflect a cut in funding for the final phase. These modifications were minor in nature and

consisted of a modification in actual transect spacing. In areas identified as "high potential" (see Chapter 8) which consisted of approximately 15 percent of the study area (3,524 acres), the same level of coverage (50 meters) as used during both the Phase I and Phase II portion of the study was maintained. Within areas identified as "medium potential" 62 percent, or 14,848 acres, a 200 foot (60 meter) transect interval was maintained. In areas of "low potential" 23 percent, or 5,508 acres, was covered with a 300 foot (90 meter) transect interval.

While it was necessary to decrease coverage in the "medium" and "low" potential areas because of reduced funding, every attempt was made by the field teams to maintain a 50 meter transect corridor interval across all three potential areas. In the majority of cases, this was possible by eliminating from the survey all areas of extremely wet land which were under water at the time of the survey.

As with the two previous phases, a Commonwealth archeological site form was completed and black and white photographs taken for each site located. Each of these sites was plotted on both USGS maps and NPS segment maps. Where cultural material was present, a collection was made of diagnostic material for later analysis.

The archeological site numbers used during the Phase III survey were consistent with those employed during the Phase I and II surveys.

CHAPTER 6

CULTURAL MATERIAL

LITHICS

Prehistoric material assemblages from sites located along the riverway are limited in terms of both quantity and variety of lithic materials and tool forms (Appendix C).

The lithic material recovered from all three phases of the St. Croix River Survey totals some 345 pieces from 56 separate localities. The bulk of the material is debitage (N=320), while cores (N=4), scrapers (N=3), bifaces (N=6), projectile points (N=6), gravers (N=1), knives (N=3) and gunflints (N=2) comprise the remaining lithics. This amounts to a density of 6.16 artifacts per site located. This low density can be explained in part by the heavy vegetation which characterizes the entire area of the St. Croix National Scenic Riverway. The meager amount of tools and debris found during the survey tends to support the evaluation of low site and population density for the St. Croix and Namekagon Rivers.

The artifact analysis presented here is descriptive, interpretive and comparative. Its primary purpose is to evaluate the nature and extent of the cultural resources

along the riverway. The analysis is, therefore, limited to describing the artifacts themselves, their density, spatial distribution, and making an initial assessment of the periods of occupation and preliminary functional interpretation. Further inferences and statistical treatment are not possible because of the small sample size from each site located.

Five major lithic material categories were used to classify the St. Croix collections. These are chert or similar cryptocrystalline structure rocks (12 percent) quartz (40 percent), quartzite (37 percent), basalt (4 percent), felsite (1 percent) and other unidentifiable material (5 percent). No attempts have been made to specifically identify the primary sources for these materials, but it can be argued that most items were derived from glacial pebbles or cobbles, or from localized outcrops. Little evidence exists in the collection for interregional trade or transportation of more "exotic" material, which is a little surprising considering that the rivers exist as natural avenues of communication and travel.

Manufacturing techniques are fairly difficult to isolate, due in part to the small sample available for analysis. No definite tool preforms were identified and little evidence exists for the use of either intentional thermal alteration or careful platform preparation to improve "knappability" or control flake removal patterns. A significant

number of the collected items were identified as pebble or cobble fragments, or chips (especially quartz and quartzite). These may or may not be by-products of tool manufacturing activities; exact derivation is probably impossible to ascertain, especially for the coarser-grained materials.

As shown in Appendix C, all items were classified according to technological and/or morphological characteristics. Flakes were identified as accurately as possible according to a processual, linear material reduction model (Shafer 1974). The majority of flakes appear to have been produced by the technique of direct percussion with a hard hammer.

Eleven recognizable tool forms were found to be represented in the collection from the research area. The following is a description of each of these tool forms:

Cores

Cores are characterized as large tabular chunks or nodules of material, with good conchoidal fracturing properties, from which flakes have been detached. Included in this class are cores with both prepared and unprepared striking platforms. They lack a prepared tool edge and edge damage which would have resulted from use as a tool. A total of four cores were represented in the sample, all of which were made of chert material. It is interesting to note that these four cores were located from four separate sites (52-106-1,

46-145-1, 47-129-3, and 54-121-1), all located south of Grantsburg (Figure 5). While caution must be taken when making conclusions from such a small sample, it is likely that these cores represent the general availability of raw material in the southern portions of the riverway. The St. Croix River at its southern end is a much more mature river with a highly developed bed which has exposed several geological strata, thus increasing the availability of raw material.

Decortication Flakes

These represent the first flakes removed in the initial reduction of a core. This class includes both primary (with more than 50 percent of the cortex attached) and secondary (with less than 50 percent) decortication flakes. The primary decortication flakes were almost always discarded waste flakes whereas the secondary decortication flakes were not always discarded but may have been used as naturally-backed knives (White et al. 1963). A total of 96 (28 percent) decortication flakes were present in the sample. Of this total, 7 (7.3 percent) were chert, 32 (33.3 percent) were quartzite, 49 (51 percent) were quartz, and 8 (8.3 percent) were basalt. One method used to measure the relative occurrence of this early stage activity is the comparison of the percentage (by counts) of cores and primary and secondary decortication flakes to all other debitage (i.e., blocky and flat flakes). As a whole, when making this comparison, the indication is that only minor amounts of

FIGURE 5

ARTIFACTS PHASE I

	Site No.	Description
a.	36-107-3	Gun Flint
b.	36-107-2	Gun Flint
c.	21-135-1	Quartzite, triangular, concave base projectile point
d.	5-136-1	Felsite Biface
e.	21-115-1	Chert, humpbacked, triangular, projectile point
f.	52-106-1	Retouched bipolar core

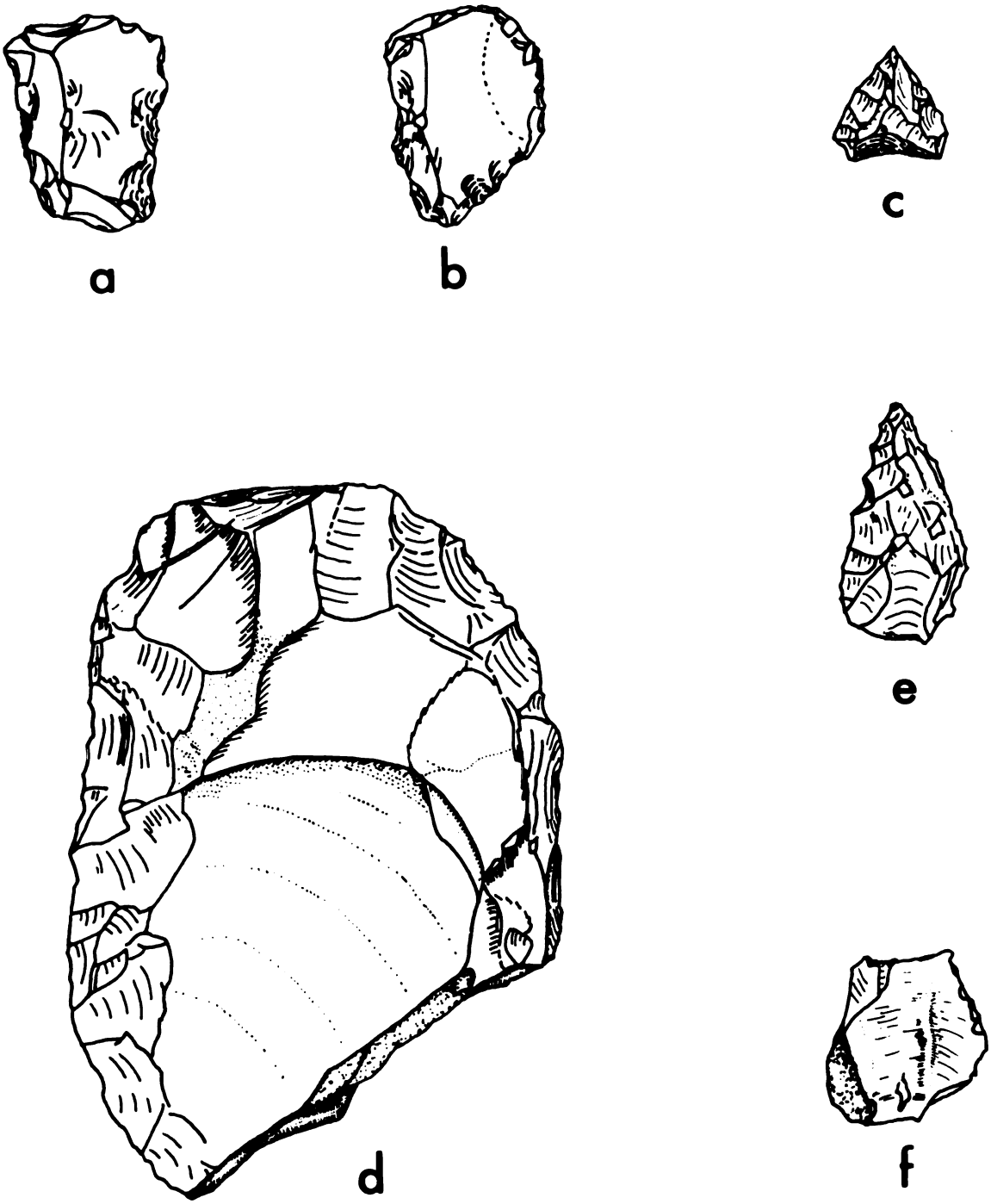


FIGURE 5

prehistoric artifacts-phase I

early stage reduction were performed at all the sites. In fact, when comparing raw material classification, this is even more strongly indicated. By raw material class these percentages are as follows: chert - 29 percent, quartzite - 26 percent, quartz - 37 percent. Basalt, felsite and others had too small a sample for meaningful comparison.

This comparison was made by raw material type for all sites as a whole because individual site collections were too small to make meaningful comparison. Therefore, any conclusion drawn by this comparison or generalized to all sites should be considered primary and tentative.

Blocky Flakes

Blocky flakes or shatter are small angular chunks with no cortex which were probably formed by coarse trimming as suggested by White et al. (1965) and Witthoft (1952) or by frost fracturing as suggested by Binford and Quimby (1963). They are distinguished from cores by the lack of detached flake scars and from flakes by the lack of observable striking platforms, dorsal and ventral faces, and other characteristics of flakes. A total of 49 (14 percent) flakes were present in the sample. Of this total, 6.1 percent were of chert, 40.8 percent of quartzite, 46.9 percent of quartz, 2 percent of basalt and 4 percent of other material. No blocky flakes of felsite were located.

Flat Flakes

Interior flakes or flat flakes are generalized interior waste flakes. These are usually flat, with no cortex present. They have observable striking platforms and ventral and dorsal faces. This class includes primary, secondary and tertiary flakes, exclusive of thinning flakes. A total of 156 (45 percent) flat flakes were present in the sample. Of this total 8.3 percent were of chert, 44 percent of quartzite, 35 percent of quartz, 2.5 percent of basalt, 2.5 percent of felsite and 7 percent of other material.

Flakes of Bifacial Retouch

These are flakes which can be identified as having been removed during the process of thinning or resharpening a biface. They are relatively flat with wide shallow flake scars on the back of the flake (from the detachment of previous thinning flakes). Their striking platforms are part of the biface edge and usually exhibit a relatively low platform angle which has been ground or crushed. A total of 11 (3 percent) retouch flakes were present in the sample. Of this total, 90.9 percent were of chert, 9 percent of quartzite, 18 percent of quartz, none of basalt, none of felsite and 9 percent of other material. It appears that most of the chert flakes are the result of thinning or bifacial retouching.

Retouched Flakes

This tool class is defined as any flakes with edge modification or wear trimming, whether unifacial or bifacial, steep or flat, regular or alternating. It can be assumed that edge damage results from its use as a tool in modifying material such as bone or wood (Tringham, et al. 1974). A total of seven (2 percent) retouched flakes were present in the collections. Of this total, four (57 percent) were made of chert, two (28.5 percent) of quartzite, three (42.8 percent) of quartz, none of basalt, none of felsite and one (14 percent) of other materials.

Scraper, or Steeply Chipped Unifaces

These characteristically have beveled edges (sometimes steep) with a zone of marginal retouching or wear on only one side. A total of three (.8 percent) were represented in the collection. Two (66 percent) of these were manufactured of chert and one (33 percent) was of basalt (Figure 6). None were found to be manufactured of quartzite, quartz or felsite.

Gravers

These are defined as flakes with a small tip or spur formed either by chipping the edges away from either side, or by the wearing of a corner into a projection. Several functions have been suggested. Macdonald (1968) states that gravers would be suited for etching designs on bone and

FIGURE 6

ARTIFACTS - PHASE II

	Site No.	Description
a.	03-103-1	Endscraper
b.	33-108-1	Retouched Quartz Flake
c.	13-126-1	Basalt Knife
d.	03-103-1	Ground Bipitted Cobble

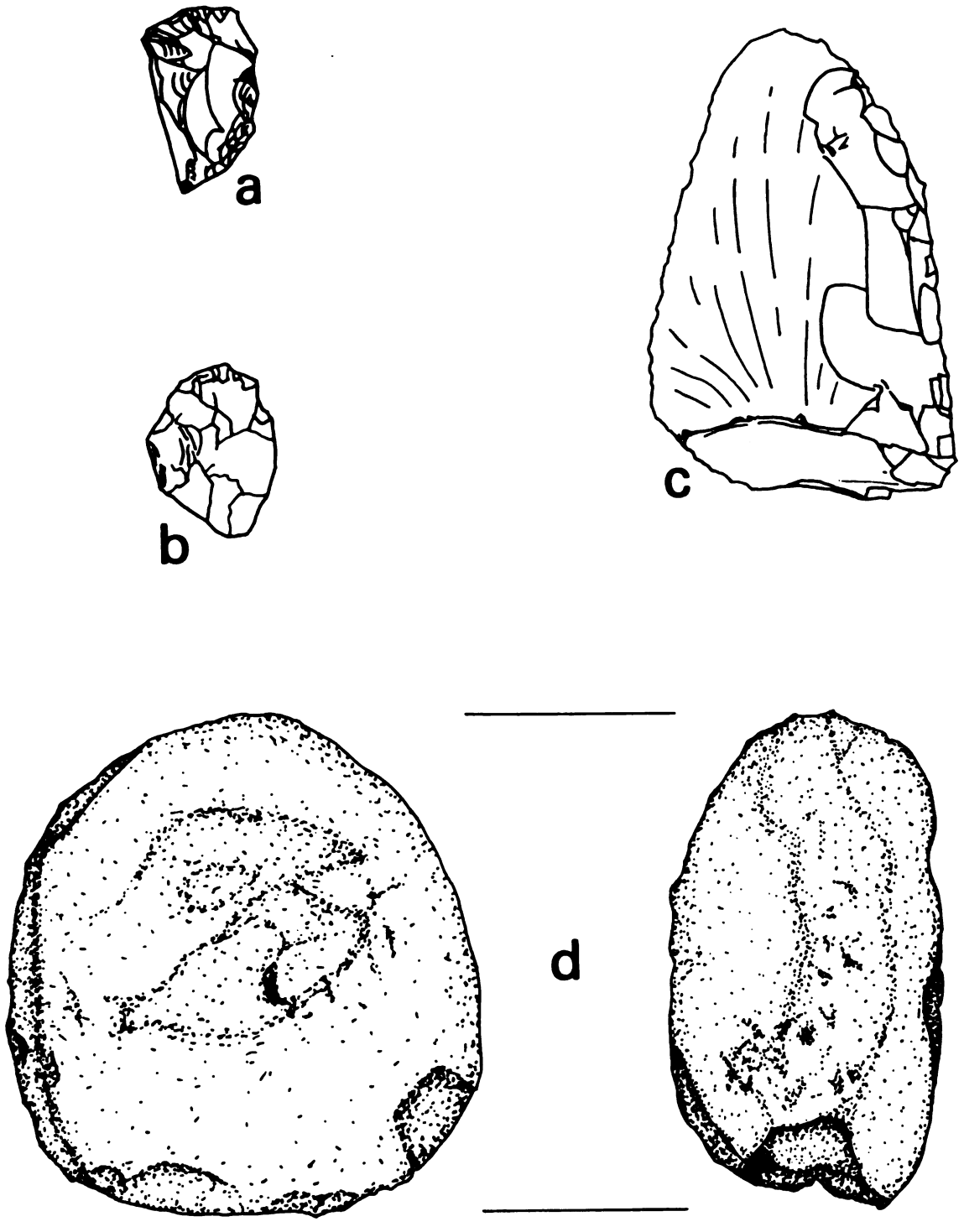


FIGURE 6

prehistoric artifacts-phase II

antler, or the manufacturing of eyed-needles as have been reported by Roberts (1941). Goodyear (1974) also suggested they would be useful in cutting animal skins. One (.2 percent) was located during the survey. This was manufactured of quartzite and found on Site 58-122-1.

Biface and Biface Fragments

This category includes whole or fragmented bifacially-worked specimens which could not be classified as to type. It may contain fragments of a number of tools such as knives, preforms, projectile points and so on. The presence of bifaces is commonly assumed to indicate hunting/butchering activities. It is also generally assumed that tips were discarded at or near the location of use after breakage of the tool, whereas basal fragments were removed from the haft at a base camp (Schiffer and House 1975). Therefore, the ratio of tips to base may be significant. Hypothetically, a high tip/base ratio may indicate use and breakage of points at or near an extraction site, while a low ratio might indicate removal of basal fragments at a base camp (Schiffer and House 1975). A total of three (.9 percent) bifaces were present in the St. Croix sample. Of this total, one was manufactured of quartz, one of quartzite and one of felsite. Although the sample size is much too small to allow meaningful interpretations at present, they do serve as test implications for subsequent site testing.

Projectile Points

In many areas, projectile points have been used as a general indication for the time period of occupation. Some shapes and sizes are very specific as to time horizon and have been placed in projectile point type groups with formal published definitions. The archeological collections from all sites in the riverway contained six (1.4 percent) points. One isosceles triangular quartzite projectile point with a concave base was found at Site 21-135-1. The point measures 17mm at the base and is 17mm in length and 5mm in thickness and is manufactured of quartzite. It may be assigned to the Late Woodland Period (Ritchie 1961). A second projectile point was found at Site 21-115-1. This point is described as a humpbacked, triangular point dating to the Late Woodland Period (Ritchie 1961). The point measures 19mm at the base, 36mm in length, 10mm in thickness and is manufactured of chert material and is light buff in color.

A projectile point base fragment was located at Site 47-129-4. This point measured 27mm in length, 29mm in width and 6mm in thickness. This point could not be identified or assigned to any definite cultural or temporal classification. It was manufactured of quartzite and shows fine pressure flaking along its edges. An additional point fragment was located at Site 58-107-1. It can best be described as a quartzite excurvate point that has been broken transversely across the top and has a hinge fracture at its

base. The point has very fine primary and secondary chipping which is probably characteristic of the high grade quartzite utilized. The point fragment measures 38mm in length, 23mm in width and 7mm in thickness. Although this point is fractured at both ends, its style is reminiscent of stemmed Late Archaic points such as those identified from the Burnt-Rollways phase by Salzer (1974). A small triangular quartz point was located at Site 53-104-1. This point was produced on a flake and is plano-convex in shape with tiny serrations (tertiary flakes) along its edges. The point is 19mm in length, 15mm wide and 4mm thick. It was impossible to assign this point to any particular cultural or temporal classification.

A corner notched projectile point manufactured from a grey chert was recovered from Site 58-122-1. This point is 39.5mm long, and has a maximum width of 25.3mm and a maximum thickness of 6.6mm. It has a triangular blade, a biconvex cross section, and a slightly convex base. In northern Wisconsin, corner notched projectile points are characteristic of the Squirrel River, Burnt-Rollways, and Nokomis Phases, which range from the Archaic through the Middle Woodland periods (Salzer 1974). In the Snake River Region of Minnesota, corner notched points are frequently associated with the Middle Woodland Period (Caine 1974), and throughout the Upper Midwest, corner notched points are

generally most characteristic of the Middle Woodland Period (Webster 1973; Kovel 1974).

As is apparent from the above description no firm cultural/historical assignations can be made based on lithic material for the majority of the 56 sites located in the riverway. The few tools that were found appear to be fairly ubiquitous components of any prehistoric tradition in the area. This is due in part to the small collections made for each site located. The emphasis of this study was focused on the presence or absence of archeological sites within different environmental subregions. Detailed cultural and temporal evaluation must wait until additional research can be undertaken at these sites.

Several of the prehistoric sites on which lithic material were recovered also produced mussel shells and animal bone fragments (Table 4), but whether these occurrences are midden deposits or not must remain a moot question until further research is conducted.

Gunflints

Two gunflints were found, one each at Sites 36-107-2 and 36-107-3. They are both used on three sides and heavily ground on the fourth. The gunflint from 36-107-2 measures 34mm in length, 25mm in width, 11mm in thickness with color grading from dark to medium grey. These appear to be of local

chert. The gunflint from 36-107-3 measures 33mm in length, 24mm in width, 12mm in thickness and grades in color from dark to a light grey. No cultural/chronological identification could be made of either of these specimens.

PREHISTORIC CERAMICS

A total of 42 prehistoric ceramic body sherds was recovered from 12 separate sites. Five (11.6 percent) pieces of pottery dateable to the Late Woodland Period have been found at 36-107-3. One piece is decorated with a twisted cord over cord-marked design and four are cord-marked. All are grit-tempered and measure 5 to 6mm in thickness. Four are reddish buff in color and one is medium grey.

Site No. 05-147-1 produced three grit tempered body sherds ranging from 4.45 to 5.65mm thick. The color of two of these sherds ranges from 5YR5/3 to 5YR5/4 and both exhibit cord-marking on one surface. The third sherd from this site also has a cord-marked surface but its color (5YR4/1) indicates it has been heated in a reducing rather than oxidizing environment.

At Site 07-123-1, two sherds were recovered which range from 6.1 to 6.25mm thick. The color of these sherds is 2.5YR4/2 on one surface while the other surface is covered with a black carbon crust (2.5YR4/2). The surface covered

with this crust exhibits cord-marking, and the other surface has been wiped or smoothed, possibly over cord-marking.

A single smooth shell-tempered body sherd was recovered from Site No. 13-169-2. This sherd is 3.75mm thick and has a color value of 5YR5/3. What appears to be the interior surface of this sherd is somewhat redder (5YR5/4) and exhibits slight finger tip indentations.

A total of eight grit tempered sherds were recovered from Site No. 47-129-3. Of these, four were exfoliated sherd fragments whose thickness could not be measured. Two of these fragments exhibit very small areas which appear to have been decorated with a dentate tool. These rows of dentate impressions are only about 1mm wide. The color of these surfaces is 5YR6/3. Of the four sherds whose thickness could be measured, one is only 2.56mm thick. It has a color value of 5YR6/4 for that appears to be its exterior, which exhibits twisted cord impressions approximately 1mm wide. The interior of this sherd is smooth and its color is 7.5YR5/2. The remaining three sherds range in thickness from 4.0 to 5.75mm thick and with either fine cord or fabric marking where each cord or fiber is much narrower than 1mm. The apparent exterior of these sherds is marked and ranges from 5YR5/3 to 5YR5/4 in color, while the interiors are smooth and range from 10YR4/1 to 10YR4/2.

Three grit tempered sherds ranging from 4.4 to 5.0mm thick were collected at Site No. 47-129-8. The apparent exterior surface of these sherds ranges from 5YR5/3 to 5YR5/4 while the interior ranges from 7.5YR5/2 to 7.5YR5/4. Two of these sherds exhibit surface treatment on their exterior consisting of fine cord-marking on one and a wider cord-marking on the other. The third sherd exhibits what may be twisted cord decoration applied over cord-marked surface treatment.

Of the four grit tempered body sherds from Site No. 47-127-9 one is an exfoliated sherd fragment and the other three range from 3.5 to 5mm thick. Both interior and exterior color ranges from 5YR5/2 to 5YR5/4. The three complete sherds exhibit cord-marked exteriors.

At Site No. 54-103-1, nine grit tempered body sherds were recovered, three of which are sherd fragments whose thickness cannot be measured. Of the six measurable sherds, one is a plain sherd 3.85mm thick and one has a cord-marked exterior, a smooth interior, and is 3.9mm thick. The remaining four sherds have smooth exteriors decorated with either a dentate or corded stamp. Sherd curvature indicates this decoration consists of horizontal rows approximately 2mm wide and 3mm apart on the neck and upper body of the vessel, with vertical or diagonal rows of impressions above these.

These decorated sherds range from 3.1 to 5.3mm thick. All sherds from this site are colored 5YR5/6.

Site 46-141-1 produced a grit tempered sherd fragment with a smoothed interior (10YR6/4); it appears to be thermally fractured. The same site yielded another grit tempered sherd 7mm thick and weighing only 1.7mm. Interior color is 7.5YR4/2 and exterior is 10YR3/3; no exterior surface treatment is discernible.

All three sherds from Site 56-103-2 were grit tempered and ranged in thickness from 6 to 7.8mm ($\bar{X}$=3.7mm). Two exhibit plain exteriors and the third is finished with overlapping cord marks 1.3mm wide (average). Exterior sherd colors range from 10YR4/2 to 10YR5/3 and interior from 10YR3/2 to 10YR4/2. Mean sherd weight is only 2.7mm.

Site No. 52-102-3 produced two ceramic sherds tempered with crushed quartz. Both sherds are cord-marked with closely spaced, parallel marking with average 2.1mm in width. Mean sherd weight and thickness are 3.7mm and 5.2mm, respectively. Exterior sherd color on both items is 10YR5/3 and interior are 10YR4/2, indicating that these two body sherds may be fragments of the same vessel.

Most of the aboriginal ceramics recovered lack diagnostic traits indicative of particular cultural or chronological

affiliation, and these can only be identified as post-dating the introduction of ceramics into the area. At this time it appears that the earliest pottery in the region dates to the Middle Woodland Period (Caine 1974:60).

Several sites yielded ceramics enabling more specific determinations of cultural affiliation. The single smooth shell-tempered sherd from Site No. 13-169-2 is indicative of an Upper Mississippian occupation or influence. Shell-tempered pottery appears to have penetrated into major Mid-western River valleys from the south between A.D. 900 and A.D. 1000 (Gibbon 1974:133).

Only very small fragments of pottery from Site No. 47-129-3 exhibited decoration, but this decoration can be tentatively identified as the fine dentate stampling characteristic of St. Croix Stamped pottery (Caine 1974:60). This is a Middle or Late Woodland type which extends from western Wisconsin to eastern South Dakota.

The twisted cord decoration on a sherd from Site No. 47-129-8 may represent a variety of Late Woodland Clam River Ware (Caine 1974:61). It is also similar to twisted cord decoration found on Lake phase (Salzer 1974:49-50) and Madison cord-impressed pottery (Hurley 1974:121), which are also Late Woodland types.

Ceramics characteristic of the Late Woodland period were also recovered from Site No. 54-103-1 (Figure 7). The cord-stamped decoration at this site may be another variety of Clam River Ware or a related Late Woodland cord-stamped type of the Kathio or Blackduck series (Caine 1974:61-62).

GLASS

The glass sample recovered during the survey may be divided among two major categories consisting of vessel and flat glass varieties. The former includes both those specimens which can be distinguished as either bottles, jars and other container forms and also a number of curved glass sherds which are unidentifiable as belonging to more specific vessel categories. Those items identified under the heading of flat glass consist of uncurved glass sherds which, among other things, may represent glass originally utilized for windows, mirrors, and clock faces. An additional category for miscellaneous glass sherds has also been established and includes specimens which have been extensively damaged by fire or constitute artifact types represented in the collection by only a small sample (Table 2).

The largest artifact category comprising this portion of the analysis consists of vessel glass (N=111) which accounts for approximately 47 percent of the total glass sample. With few exceptions these specimens can be identified as being representative of bottle forms. The following

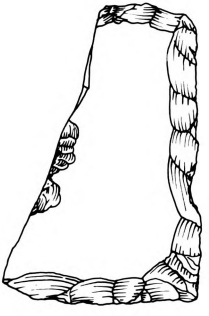
FIGURE 7

ARTIFACTS PHASE III

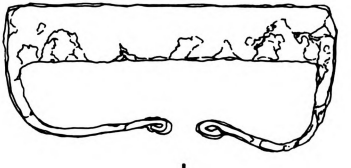
	Site Number	Description
a.	54-103-1	Prehistoric Pottery
b.	58-122-1	Projectile Point
c.	47-129-10	Flat Glass
d.	47-129-9	Strike-a-lite

a

b



c



d

0 1 2 3 4 CENTIMETERS

LIFE SIZE

FIGURE 7

artifacts-phase III

TABLE 2

GLASS DISTRIBUTION

GLASS DISTRIBUTION	PHASE I									
	6-145-1	14-144-1	26-114-1	32-109-1	42-106-1	52-102-1	54-101-2	55-112-1	56-103-1	TOTAL
VESSEL GLASS										
Clear	--	1	9	1	1	4	1	--	--	17
Lt. green	--	--	--	--	--	--	--	--	--	--
Green	--	--	--	--	--	--	--	--	--	--
Lt. blue	--	--	--	--	--	--	--	--	--	--
Blue	--	--	--	--	--	--	--	--	--	--
Brown	--	--	2	--	--	--	--	--	--	2
Violet	--	--	--	--	--	--	--	--	--	--
Amethyst	1	--	5	--	--	--	--	--	--	6
Amber	--	--	--	--	--	--	--	--	--	--
Milk	--	--	--	--	--	--	--	--	--	--
Pink	--	--	--	--	--	--	--	--	--	--
FLAT GLASS										
Clear	--	2	--	6	--	10	1	2	3	24
MISCELLANEOUS										
Marble	--	--	1	--	--	--	--	--	--	1
Melted	1	--	--	--	--	26	--	1	--	28
Amorphous	--	--	--	--	--	--	--	--	--	--

TABLE 2 (cont'd)

GLASS DISTRIBUTION	PHASE I									
	6-145-1	14-144-1	26-114-1	32-109-1	42-106-1	52-102-1	54-101-2	55-112-1	56-103-1	TOTAL
TOTAL	2	3	17	7	1	40	2	3	3	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	78

TABLE 2 (cont'd)

GLASS DISTRIBUTION	PHASE II													
	03-183-1	04-165-1	15-102-1	15-102-2	15-140-1	16-122-1	18-108-1	24-112-1	25-107-1	27-105-1	48-108-1	48-115-3	56-112-1	TOTAL
VESSEL GLASS														
Clear	1	3	--	5	--	2	--	--	--	--	--	9	3	23
Lt. green	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Green	--	2	--	--	1	--	--	--	--	6	--	--	--	9
Lt. blue	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blue	--	--	--	--	--	--	--	--	--	--	--	--	2	2
Brown	--	--	--	--	--	1	--	--	--	--	--	1	--	2
Violet	--	--	--	--	--	--	1	--	--	--	--	--	--	1
Amethyst	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Amber	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Milk	--	--	1	--	--	--	1	--	1	--	--	--	--	3
Pink	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FLAT GLASS														
Clear	--	--	--	--	22	--	--	5	--	--	--	3	--	30
MISCELLANEOUS														
Marble	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Melted	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Amorphous	--	--	--	--	--	--	1	--	--	--	2	--	--	3
TOTAL	1	5	1	5	23	3	3	5	1	6	2	13	5	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	73

TABLE 2 (cont'd)

GLASS DISTRIBUTION	PHASE III																GRAND TOTAL
	03-116-1	06-180-1	12-133-2	13-170-1	28-101-2	29-119-1	32-109-2	47-129-1	47-129-9	47-129-10	51-104-2	53-107-1	54-101-3	54-104-1	56-119-1	TOTAL	
VESSEL GLASS																	
Clear	1	2	4	--	1	3	--	--	--	6	--	--	--	--	--	17	57
Lt. green	--	4	--	3	--	--	--	1	--	--	--	--	--	1	--	9	9
Green	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1	10
Lt. blue	--	--	--	--	--	--	--	10	--	--	2	--	--	--	--	12	12
Blue	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Brown	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	5
Violet	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Amethyst	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	3	9
Amber	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	1
Milk	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	4
Pink	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	1
FLAT GLASS																	
Clear	--	--	--	--	13	1	--	2	--	2	--	2	9	--	2	31	85
MISCELLANEOUS																	
Marble	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Melted	--	--	--	--	--	--	--	--	--	--	--	--	8	--	--	8	36
Amorphous	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
TOTAL	1	6	4	3	15	4	1	13	1	12	2	2	17	2	2	85	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	236

descriptive analysis segregates the collected sample according to both color ranges and certain functional and technological variables directly related to vessel form (Table 2). In dealing with vessel glass, the largest portion of the collection is composed of numerous bottle forms, some of which are intact, while others are represented by fragmentary sherds.

Brown vessel glass was collected during the survey from four sites, 26-114-1, 16-122-1, 48-115-3 and 47-129-10. A small sample of two brown glass sherds were recovered from 26-114-1 and probably represent beer bottle fragments of the Prohibition period. Site 16-122-1 consists of a single bottle sherd. An intact bottle form was recovered from Site 48-115-3. This specimen is a machine made cylinder shape 13cm in height and 4.7cm in diamters. Its base is marked with a dot-in-diamond motif placed over a "w" and the numeral "11". This mark may be indicative of the consolidation of the Whitney Glass Works as a division of Owens and Owens Illinois in 1918. The plant, which was located in Glassboro, closed in 1937 (Toulouse 1972). These specimens are far too fragmentary to provide any meaningful information relative to vessel form or manufacturing technique. Site 47-129-10 produced one brown bottle base fragment weighing 27.1 grams.

Clear glass bottle sherds form the bulk of the vessel varieties (N=47, 42 percent) collected during the survey.

In this category at least three separate varieties of glass can be distinguished through visual examination. These include clear glass which exhibits a greenish tint due to compositional impurities in the silica additives. Glass of this type was commonly utilized throughout the nineteenth and early twentieth centuries for the manufacture of common bottles and cylinder blown window or flat glass. In the contemporary literature of the mid-nineteenth century it is generally referred to as "german green" (Gallatian 1853). Examples of this clear glass variety were recovered during the survey from Sites 16-122-1, 48-115-3, 56-112-1, 03-116-1, 26-114-1, 54-101-2, 32-109-1 and several specimens from 16-122-1 represent an intact rectangular bottle of four piece mold manufacture dating no earlier than the post-1904 period (Munsey 1970). This bottle measures 21.5cm in height, and its basal dimensions are 7.3cm by 4.8cm. A centrally positioned circular cutoff scar on the base is embossed with the letter "S" and also what appears to be an "8" which is partially obliterated by the cutoff scar. The example recovered from 48-115-3 is represented by a fragmentary cylindrically shaped bottle, while that associated with 56-112-1 represents the side of a rectangular paneled bottle with an embossed script, "Gha...". The specimen from Site No. 03-116-1 is a bottle fragment of a complete side from top to bottom with one seam present and a crown top. It measures 25.2cm in length. Among the four sherds collected from 26-114-1, only two specimens provide any information relative

to vessel form. One of these is represented by a fragmentary mark "SB & Co/49." The other specimen represents a bottle mouth with an applied collar rim. A three piece molded bottle base fragment embossed with the numbrical "6" or letter "g" was also recovered from 54-101-2. The bases of three additional bottle fragments were collected from Sites 32-109-1 and 52-102-1. That associated with the former site consisted of an unmarked three piece molded specimen measuring 7.4cm in diameter. The two specimens recovered from Site 52-102-1 consisted of two paneled forms, one of which measured 4.1cm by 2.1cm in base diameter, and was embossed along either side with the product name and point of origin "...RKEE & CO/...W York." The other bottle base was of two piece mold construction, exhibited horizontal corner fluting and a pontil mark. This latter specimen possessed a rectangularly shaped base measuring 2.8cm by 1.7cm.

Another clear glass variety recognized during the survey consists of those specimens which exhibit a pinkish to amethyst coloration due to the oxidation of manganese additives with exposure to the ultraviolet rays of the sun. The use of this element as a decolorizing agent in the manufacturing of clear glass is generally attributed to the 1880-1915 period. At the opening of World War I the North American glass industry was forced to adopt selenium as a substitute decolorizing element (Munsey 1970).

Among the examples of this compositional variety collected during the survey were three sherds from 48-115-3. One of these specimens represents a hand manufactured bottle mouth and neck segment, while another sherd exhibits an embossed label identifying it as a wine bottle or jug. This script is partially obliterated, but reads in part as follows: "A.M.S..../1902/249HEN.../MINNEAPOL.../MINN/CALIFORNIA/WINE DEP.../...TAR...S...".

An intact specimen recovered from 04-165-1 measures 25cm in height, 7.4cm in base diamters, exhibits a ten sided paneling of the body and neck and a threaded mouth. The bottom of the base possesses a circular suction cutoff scar indicative of a post 1904 period of manufacture. This vessel style can tentatively be identified as representing a probable catsup bottle. Other bottle fragments collected during the survey included five purple tinted sherds associated with Site 26-114-1 and a single purple tinted neck fragment recovered from Site 6-141-1.

Additional specimens of this type were recovered from Site 12-113-2, including one complete four sided bottle measuring 12.5cm in length with a base measurement of 3cm by 4.5cm with embossed lettering "Z-O-LO BRAND SHOE DRESSING" on one side with "888" on the bottom. The other specimen from this site is a fragment which is part of a base and side with "MUCO-S....".

The last of the bottle varieties listed under the clear glass category are those which exhibited no discernible discoloration due to oxidation. The use of a selenium decolorizing agent in glass manufacturing during the ca. 1915-1930 period generally results in the acquisition of a slight amber tint when subjected to ultraviolet rays; none of the clear glass specimens in the sample exhibit any indication of discoloration. The fact that a non-reducing arsenic substitute for selenium was adopted by the American glass industry during the early 1930's may suggest these specimens as dating to this later period. However, other factors such as the amount of selenium included in the glass composition and the context of deposition must also be considered.

A single rectangular wide mouth screw-top bottle was recovered from 03-183-1. This specimen measured 8.3cm in height and 4.4cm by 3.2cm at the base, and was apparently manufactured through the automatic machine technique developed by Owens in the post-1903 period. The base is embossed with the Owens Illinois Glass Company logo, but lacking the "I". Between 1929 and 1954 bottles produced by this company were marked to designate the plant of manufacture, year of manufacture and mold details (Toulouse 1972). This specimen was accordingly produced in plant "12", in the year "7" (possibly 1936) and was associated with mold detail "2".

Two additional clear glass bottles were recovered from 04-165-1 (Figure 8). These included a screw-top form with an octagonally faceted body of four piece mold manufacture. A centrally positioned plunger or kick-up scar on the bottom of the base denotes a probable 1930-1940 period of manufacture (Munsey 1970).

The other clear bottle collected from the site is a paneled rectangular specimen of four piece mold manufacture. This example is 15.4cm in height and measures 6cm by 3.4cm in basal dimensions. It is embossed on one panel with the product name "WATKINS", and an additional embossing on the bottom of the base, "CONTAINER/MADE IN U.S.A.". The base further exhibits a circular cutoff seam commonly associated with machine produced bottles during the ca. 1904-1930 period.

A total of five clear glass bottle specimens were associated with 15-102-2. All of these were of a four piece mold technique of manufacture and date within the ca. 1910-1940 period. Included in the sample were two fragmentary specimens represented by a bottle top and a base. The former consists of the mouth, neck and shoulder zones of what was apparently a cork top whiskey bottle which exhibits machine-blown seam features (Munsey 1970). The base segment represents an octagonally paneled catsup bottle measuring 6.3cm in diameter and exhibits an embossed product mark along the bottom, "HJ HEINZ CO/PATD", encircling the glass manufacturer's mark

FIGURE 8

GLASS ARTIFACTS - PHASE II

Glass

	Site No.	Description
a.	15-140-1	Bottle; Merchant's Gargling Oil Company, Lockport, New York.
b.	04-165-1	Bottle base; American Bottle Company, Chicago, Illinois.

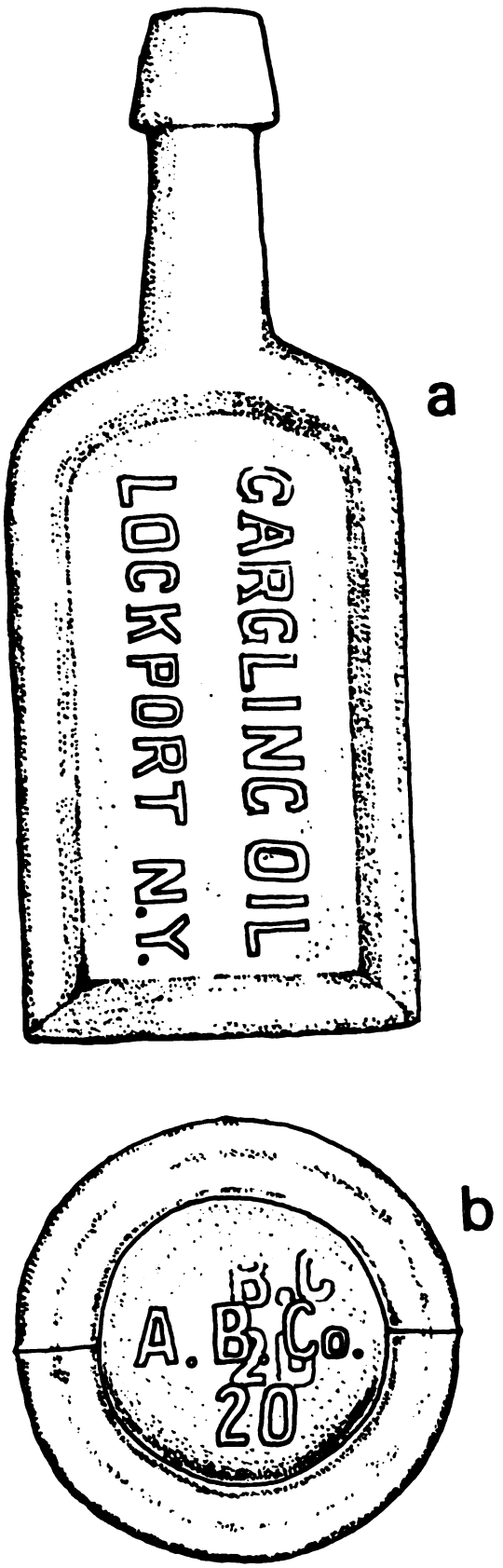


FIGURE 8

glass artifacts-phase II

which identifies it as being a product of the Owens Bottle Company of Toledo, Ohio (Toulouse 1972:3). This mark, the circle-in-square, was used by the company during the 1911-1929 period.

Three intact bottles were also collected from the site. Among this group was a small cork top cylinder shaped specimen measuring 8cm in height and 3.3cm in diameter. This bottle was machine-blown and exhibits a bottom I-in-diamond manufacturer's logo identifying it as a product of the Illinois Glass Company produced during the 1916-1929 period (Toulouse 1972:4). In addition, a paneled, screw-top mustard bottle measuring 10cm in height and 7cm in base diameter was also collected. This container is embossed along the shoulder with the legend "It's FRENCH'S" and exhibits a bottom embossing of the numeral "10" encircled by the legend "DESIGN PAT'D/FEB-23-1915".

A single pharmaceutical bottle was also recovered from 15-102-2. This example is rectangular in form, of four piece mold manufacture measuring 20.8cm in height and 7.6cm by 4.1cm in its basal dimensions. The bottle mouth is adapted to the metal crown cap variety of seal introduced in 1892 (Lorrain 1968). One panel is embossed with the legend "THE JR WATKINS CO/Rq. U.S. Pat. Off.", while the base is marked with the glass manufacturer's logo P-in-Triangle, set below the letter "G".

A single machine-blown rectangular bottle measuring 11.2cm in height and 3.6cm by 2.8cm in basal dimensions was collected from 16-122-1. This example possesses an embossed diamond shaped bottom mark set over the letter "I". This is apparently a product of the Diamond Glass Company of Royersford, Pennsylvania. This company was organized in 1888 and has utilized the diamond motif to identify its products since approximately 1924 (Toulouse 1972).

The five clear glass examples collected from 48-115-3 included both one intact bottle and a single embossed base fragment. The former is a machine-blown rectangular shaped example with an elongated oval shaped base. Its overall dimensions are 20.6cm in height and 8.5cm by 5.4cm. The mouth is adapted to a cork seal and an embossed label occurs on one side of the bottle. This script denotes both the variety of contents "LYDIA E. PINKHAM'S/MEDICINE" and the amount "14 1/2 OZS.".

The base fragment associated with this site is also embossed "KE....MFG. CO/SAND SPRINGS OKLA/PAT 5/AUG 31/1915". This script identifies the specimen as being a product of the Kerr Class Manufacturing Company which operated out of Sand Springs from 1912 to 1946 (Toulouse 1972).

Two clear glass bottle fragments were also collected from 56-112-1. One example represented by a bottle neck and

mouth segment exhibits mold seam pattern attributable to the automatic bottle machine developed by Owens in 1903.

Three clear glass specimens were associated with Sites 26-114-1 and 52-102-1. These exhibit little more than color for attribute analysis. Site 12-133-2 produced two fragmented bottles. The first of these is a rectangular bottle measuring 13.2cm in height with a base of 4.1cm by .7cm. No markings are evident on the bottle. The second of these is a rectangular stopper-type bottle with seams all the way up opposite sides. This measures 13.5cm in height with a base measurement of 3.5cm by 5.5cm. A small sample of four clear glass tumbler rims were recovered from Site 26-114-1.

Green glass bottle sherds were recovered from 04-165-1, 16-140-1, 27-105-1 and 47-129-1. Those associated with the former site consist of two bottle base fragments. These include one example measuring 11.1cm in diameter and exhibiting a machine-made valve mark commonly found on bottles manufactured during the 1930-1940 period (Munsey 1970). The other specimen measures 6.4cm in diameter and represents one of several post-bottom mold varieties manufactured during the late nineteenth and early twentieth centuries. This specimen is embossed with the letters "A.B.Co/20", identifying it as a product of the American Bottle Company which operated out of Chicago from 1905 to 1916 (Toulouse 1972). The corporation had been formed through the amalgamation of several different

glass works located in Illinois and Ohio, which may serve to explain the presence of the largely obliterated embossing "B.C./20" also found on this base (Figure 27b). These initials probably reflect the transfer of molds to the American Bottle Company from one of the firms participating in its incorporation. In this case, the most likely association would be with the Ohio Bottle Company, or OBC, which operated out of Newark from 1904 to 1905 (Toulouse 1972).

A single green bottle was associated with 15-140-1. This example is rectangular in shape measuring 14.5cm in height and 6.8cm by 3.8cm in its basal dimensions (Figure 8). The seam patterns indicate its manufacture in a post-bottom mold, the mouth having been applied by hand and adapted to a cork seal. One panel of bottle is embossed "GARGLING OIL/ LOCKPORT, N.Y.". This product was manufactured by the Merchant's Gargling Oil Company from about 1833 to 1900. Advertised both as a gargling oil and liniment, the product was recommended as being:

> ...good for Burns, Scalds, Rheumatism, Flesh Wounds, Sprains, Bruises, Lame Back, Hemorrhoids or Piles, Toothache, Sore Throat, Chilblaine, Chapped Hands, and many other diseases incident to man and beast - Yellow wrapper for animal and white for human flesh (Munsey:282).

The example collected from this site can be dated to a ca. 1880-1900 context.

The six green glass sherds collected from 27-105-1 represent a wood mold blown case bottle. This specimen is olive green in color and the square shaped base measures 5.3cm in diameter. The mouth is hand applied, a blob top presumably adapted to a cork seal. This variety of bottle was popular throughout the nineteenth century and was generally used as a container for bitters or other alcholic beverages. This particular site is represented in total by the occurrence of these six sherds.

One green glass sherd was recovered from Site 32-109-2. This is the base of a wine bottle that measures 7cm across and 15.8cm high. The specimen was too fragmentary to determine the mode of manufacture.

Other colored vessel glass examples recovered during the survey include a heavily burned example of violet colored glass collected from 18-108-1. This specimen is molded and presumably represents a compote or tray stand. A single milk glass, two-holed button measuring 1cm in diameter was also associated with this site, apparently representing a collar button. A small milk glass jar measuring 6.1cm in height and 5.7cm in diameter was collected from 15-102-1. This example exhibits a square shaped base and is adapted to a screw-top wide mouth seal. This variety of vessel was commonly associated with the marketing of cold creams and similar toiletry articles during the early part of the present century

(Kresge 1913). In addition to the above examples, another milk glass sherd was recovered from 25-107-1. This specimen exhibits a ribbed or fluted molding over which a thin applique of yellow paint has been applied.

A total of 85 flat or window glass sherds were collected, from 16 separate sites (Table 3). Forty percent of the samples measured 2.0mm in thickness and an additional 40 percent measured 2.5mm in thickness. All other specimens varied in thickness from 1.8mm to 7.5mm.

Recent archaeological analysis of flat glass samples have concentrated upon their potential use as a dating mechanism (Walker 1971:77-78; Grosscup and Miller 1968:36; Grosscup 1972:13; Demeter and Lowery 1977:78-82). The available data indicates that a marked increase in the thickness of window glass begins to occur sometime during the mid-nineteenth century.

Grosscup has suggested a method of analysis directed at determining the modal of composition of the recovered sample (Grosscup 1972). This method seeks to establish what overall shifts in thickness ratios may have occurred through time. Although only a minimal amount of data is presently available for comparative investigation, a generalized trend toward increased thicknesses has been recognized among sites dating to the mid and late nineteenth century.

TABLE 3

FLAT GLASS THICKNESS

Flat Glass Thickness	1.8	2.0	2.1	2.2	2.3	2.5	3.0	3.5	7.5
SITE									
14-144-1						2			
32-109-1		1	2		1	1	1		
52-102-1	3	5		2					
54-101-2			1						
55-112-1		2							
56-103-1						3			
15-140-1						21		1	
24-112-1	1	1	1		1	1			
48-115-3				1		2			
28-101-2		10				3			
29-119-1		1							
47-129-1		2							
47-129-10		1							1
53-107-1						1	1		
54-101-3		9							
56-119-1		2							
TOTAL	4	34	4	3	2	34	2	1	1
GRAND TOTAL									85

The sherds associated with the located sites are encompassed within a thickness range extending from 1.8mm to 3.5mm with the exclusion of one specimen at 7.5mm which will be discussed later. The bulk of the material shows a bimodal distribution with 40 percent of the material measuring 2.0mm and additional material measuring 2.5mm in thickness.

This information is readily correlated with similar data collected from Feature 6, a dry well, excavated at the Berrien Springs Jail site in southwestern Michigan. Approximately 80 percent of the flat glass recovered from this feature, dating to an 1890-1910 temporal context, fell within a thickness range from 1.8 to 2.5cm. The largest segment, 32 percent, was composed of glass measuring 2.0 to 2.1cm in thickness (Demeter and Lowery 1977:80).

The flat glass sample collected during the survey may thus suggest a continued trend towards greater thickness ratios occurring during the 1910-1940 period. It is impossible at this point, however, to demonstrate the postulate on the basis of such a small artifact sample available in this collection.

In addition, the flat glass collection tends to support the contention of a bimodal distribution of historic sites within the riverway with the earliest settlement sites in

the lower portions of the St. Croix with settlement in the upper portions of the St. Croix and Namekagon being restricted until the post logging era ca. 1910-1940.

One additional piece of flat glass was located which did not fit into the above described categories. This is a piece of clear plate glass from Site No. 47-129-10 which is trapezoidal in shape and measures 72mm long, 43.5mm wide at its base and 7.5mm thick (Figure 7). This has been uniformly flaked on three of its four sides. Two of the three sides show evidence of wear. The exact function of this is unknown at this time, though it is likely that it was used as a sharp cutting tool.

EARTHENWARE

The earthenware sample collected during this study consisted of 323 specimens (Appendix D). The largest segment, 161 sherds (49.8 percent), consisted of white bisquit, soft paste wares. In descending order of incidence, the remainder of the collection contained: 82 (25 percent) specimens of white bisquit, semivitreous paste wares; 28 (8.6 percent) colored bisquit, vitreous paste wares; 19 (5.8 percent) colored bisquit, semivitreous paste wares; 14 (4.3 percent) white bisquit, vitreous paste; 2 (.6 percent) colored bisquit, soft paste; and 7 (2 percent) of other earthenwares.

The widespread occurrence of this artifact category renders it as a critical component in historic site analysis. Not only do earthenwares provide potentially useful data for socioeconomic interpolations, but also form a relatively reliable dating mechanism. This is especially true of those sites dating through the late eighteenth and nineteenth centuries. During this period relatively rapid changes occurred in the use of certain decorative motifs, color arrangements, vessel forms and the introduction of new glazes. The systemization of these trends has been dealt with by numerous investigators (Brose 1965; Hume 1971; Pilling 1967 a, b, c,; South 1972).

The largest single artifact category recovered during the survey consisted of earthenwares. The majority of these were associated with a post-1900 temporal context, with only a small segment of the collection dating to the mid-nineteenth century.

The appended table has been designed in order to express certain morphological traits which lend themselves to the generalized type of approach employed in descriptive analysis (Appendix D). This system is based upon certain characteristics such as bisquit or paste coloration, the relative appearance or hardness of the bisquit body (i.e., soft, semivitreous and vitreous), the associated decorative techniques employed and glaze coloration.

Cream colored glazed wares were initially introduced by the Staffordshire potteries as a luxury item, commonly referred to as Queens Ware, during the early 1760's (Miller and Stone 1970). The extensive manufacture of cream colored wares during the next several decades had by the turn of the nineteenth century relegated it to a common glaze variety for table wares. At about this period a rapid decline in its manufacture and popularity is demonstrated through its limited archeological occurrence. A brief revival in the popularity of cream colored glazed wares was noted by Ramsey as having taken place in the United States sometime prior to 1939 (Ramsey 1939:152). A number of such "Ivory body" dinner sets were advertised in the 1927 Sears, Roebuck Catalogue (Mirken 1970:915). Although these wares continued to be produced throughout the first half of the nineteenth century, they comprise only a minute segment of the total ceramic artifact assemblage recovered from sites dating to this period.

The 21 cream colored glazed sherds recovered from Sites 54-101-2, 4-153-1, 04-165-1, 56-112-1, 06-180-1, 10-115-1, 29-119-1 and 47-129-10 date to the first half of the present century and are possibly representative of American produced wares (Ramsey 1939).

Pearl glazed wares were developed and introduced as a replacement for cream colored wares by Josiah Wedgwood in

about 1779 (Hume 1969). This variety can be distinguished in that it is marked by a bluish tint which is most readily discernible along the interior of the standing ring and other crevices where the glaze tends to puddle. Cream colored wares, on the other hand, exhibit a yellow or cream colored tint which often exhibit a yellow to greenish puddling zone along the interior of the standing ring.

During the 1820-1830 period, the apparent reduction of cobalt additives in the glaze composition reduced the heavy bluing effect characteristic of the earlier pearl glazed white soft paste wares. The lighter blue tones associated with this later glaze variety has tentatively been interpreted by Hume as representing the "New White Ware" listed in the Wedgwood factory price guide of 1810 (Hume 1969). However, for the purposes of this analysis, specimens representative of this lighter blue toned glaze have been grouped under the pearl classification. This classification contains a total of 12 specimens. Two specimens exhibiting a light bluish tint in glaze coloration that represent rim and handle fragments of a mug form were recovered from Site 56-112-1 (Figure 9). Two undecorated sherds were recovered from Site 56-103-1, six brown transfer-printed sherds were associated with Sites 6-145-1 and 26-114-1 and a single red transfer-printed sherd was recovered from Site 33-101-1.

FIGURE 9

EARTHENWARE ARTIFACTS - PHASE II

Earthenware

	Site No.	Description
a.	04-165-1	Stoneware (White slip glaze); Union Stoneware Company, Red Wing, Minnesota.
b.	56-112-1	Whiteware (soft paste); probably a product of the Crown Pottery Company, Evansville, Indiana.

a

b

FIGURE 9

earthenware artifacts
phase II

Although these specimens may date to a pre-1850 temporal context, their fragmentary nature precludes any definitive assessment of their correct chronological placement. Another specimen which may be classified under the pearl glazed category is a sherd possibly from either a small pitcher or mug decorated with a blue, white and black banded motif. This sherd was collected from Site 52-102-1 and represents a ware produced throughout the nineteenth century by the English, American and German potteries (Sprago 1972).

The two undecorated sherds collected from Site 56-103-1 may actually be representative of a later variety of blue flow decorated white soft paste earthenware similar to that recovered from Site 42-109-1, and which appears to have been a relatively popular motif during the ca. 1890-1910 period.

Approximately 49 percent (N=80) of the white soft paste earthenwares collected during the survey consisted of a clear or white glazed variety. These were largely of American manufacture and generally date to a post-1900 context.

Included within this classification are fifteen sherds exhibiting various overglaze decorations. This included examples of decalcomania motifs recovered from Sites 1-110-1 and 26-114-1. The four sherds collected from the former

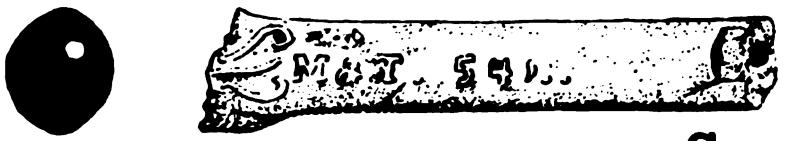
site represent a bowl form measuring 16cm in diameter. An associated black transfer-printed bottom mark "Steubenville/ China" identifies it as a product of the Steubenville Pottery Company, an Ohio firm which had been established in 1879 (Kovel 1962:26) (Figure 10). This specimen is decorated with a blue bird motif commonly associated with the productions of a number of American manufacturers during the ca. 1910-1930 period. A single cream colored glazed sherd decorated with a decalcomania overglaze motif was also recovered from Site 36-107-2. Two additional overglaze decorated plate sherds were recovered from Site 26-114-1. This decoration consisted of a handpainted pink floral motif which was largely obliterated.

Two dinner plates are represented by eight overglaze gold decorated sherds recovered from Sites 1-110-1 and 4-153-1. Both specimens were manufactured by the Edwin Knowles China Company, a probable successor to the Knowles, Tyler, Knowles pottery of East Liverpool, Ohio (Kovel 1962: 79). While both specimens are marked with identical green transfer-printed manufacturer's marks, that recovered from 1-110-1 is enumerated "20-2-3", (Figure 10), while the other example exhibits a slightly different number, "20-2-1", partially obliterated by a break line. It is possible, when considering the temporal context indicated at both sites, that this form of enumeration may represent either patent or

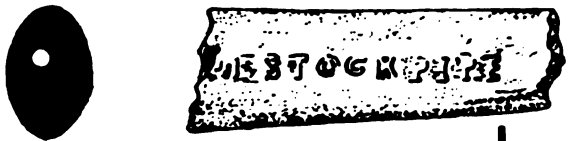
FIGURE 10

EARTHENWARE BOTTOM MARKS AND
CLAY PIPE STEMS - PHASE I

	Site No.	Description
a.	6-145-1	Clay pipe stem fragment
b.	6-145-1	Clay pipe stem fragment
c.	36-107-2	Pitcher fragment, American producer
d.	1-110-1	Dinner plate fragment
e.	26-114-1	Earthenware fragment, Mfg. at Mt. Clemens Pottery Company at Mt. Clemens, Michigan
f.	1-110-1	Bowl fragment, Steubenville Pottery Company in Ohio
g.	1-110-1	Platter fragment, Mfg. at Laughlin Pottery of East Liverpool, Ohio



a



b

c

d

EDWIN M. KNOWLES
CHINA CO
20-2-3
PATENTED

e

f

g

FIGURE 10

earthenware bottom marks and clay pipe stems- phase I

production dates (i.e., February 3, 1920, etc.), or might possibly be indicative of pattern identification numbers. Information relative to this problem is lacking in the available literature.

The collections made from Site 36-107-3 include two clear glazed cup and saucer fragments. Both are decorated with a brown underglaze band along the rim which also contains traces of an overglaze luster applique. This type of band motif is generally associated with a variety of decoration normally referred to as "tea leaf" in the antique trade. It is illustrated in the Sears, Roebuck reprint catalogue for 1897, and is designated as "Luster Band", a ware "so well known that a description is hardly necessary".

Included among the undecorated white glazed earthenware sample are two marked specimens recovered from Sites 1-110-1 and 26-114-1. These include a platter collected from Site 1-110-1 and manufactured at the Laughlin Pottery of East Liverpool, Ohio, which was established in 1872 (Kovel 1962:83) (Figure 10). The specific trademark illustrated in Figure 10 was used by the Homer Laughlin and Company from 1877 to 1897 (Lehner 1978:48). The other specimen bears the mark of the Mt. Clemens Pottery Company of Mt. Clemens, Michigan. This pottery had been established in 1913 and distributed its wares on a nationwide basis through the

S. S. Kresge dime store chain during the post World War I period (Kresge 1913) (Figure 10).

An additional seven undecorated sherds were recovered from Sites 16-122-1, 48-155-3, and 56-112-1; three cup and saucer fragments decorated with thin underglaze blue hand-painted lines recovered from 18-108-1; a single bowl rim decorated in an overglaze decalcomania floral applique, and gold overglaze interior rim line recovered from 16-122-1. All of these specimens can be fixed within a temporal context dating to the first half of the present century and are probably all of American manufacture.

One undecorated white glazed sherd collected from Site 56-112-1 exhibited a manufacturer's mark depicting a crown and the initials "C.P.Co" (Figure 9). Similarly marked ceramics have been recovered during the Silcott excavations and date to the early part of the present century (Adams, Gaw, Leonhardy 1975:265). There were at least four potteries operating during the opening of the present century that employed these initials in identifying their productions. These include three American manufacturers: the Chittenango Pottery Company of Chittenango, New York (ca. 1900); the Chester Pottery Company of Phoenixville, Pennsylvania (ca. 1894); and the Crown Pottery Company of Evansville, Indiana (ca. 1895) (Kovel 1962:31-2). The use of a crown logo in conjunction

with these initials would tend to lend some support for attributing this specimen as being a production of the last factory.

In addition to these specimens, a group of five badly burned soft white paste sherds were recovered from 18-108-1. Due to heavy fire damage these specimens can be only tentatively identified as representing white glazed wares. No evidence of decoration, beyond molded floral designs, are observable on any of these examples.

The soft white paste wares comprising this sample presumably represent articles of American manufacture. During the post-World War I period, the position of foreign produced tablewares sold in the United States witnessed a dramatic decline. By 1937 foreign wares accounted for only 17 percent of domestic consumption. This represented a little more than a third of its prewar position, which was estimated at approximately 45 percent (Newcomb 1947:233).

Those earthenwares included under the heading of semi-vitreous possess a hard granular paste similar to porcelain but lacking its translucent qualities. As employed by numerous manufacturers of the nineteenth century, such labels as Granite, Stone China, Opaque China or even Ironstone were in many instances little more than an attempt to impress upon the public mind the concept of an improved and more

durable tableware. While such specimens are characteristically thicker in composition, tests for hardness often prove to be inconclusive. A number of earthenware listed in Table 7 as white soft paste varieties, such as the two Knowles "Vitreous" specimens, are representative of this situation.

A total of 82 sherds collected during the survey may be placed within the semivitreous category. The majority (N=37) of these 82 sherds can be classified as white or clear glazed sherds. Five of these were collected from Sites 49-101-1 and 55-112-1. The three sherds collected from the former site represent a chamber pot and lid. This specimen is undecorated and possesses a black transfer-printed manufacturers mark of "Mellor, Taylor & Co.", a company which operated out of Staffordshire, England, between 1880 and 1904 (Godden 1964:432, Figure 26). Additional specimens from this classification were recovered from Sites 10-115-1, 12-13-2, 13-170-1, 32-109-2, 47-129-1, 47-129-9, 47-129-10, 53-107-1, and 56-119-1. The largest collection (N=14) was from Site 47-129-10. This was comprised primarily of plate and cup fragments (Appendix D).

The next numerous class of specimens under the heading of semivitreous possesses as a glaze tone reminiscent of the bluing effect associated with the previously discussed soft paste pearl wares (Appendix D). This variety of blue tone glazed semivitreous earthenware appears to be identified in

contemporary ceramic advertisements of the mid-nineteenth century as "pearl" glazed (Collard 1967:131). Although archeological evidence relative to the temporal distribution of this ware is sketchy, a tentative 1850-1890 date range is suggested by the available information. A total of 35 specimens were recovered from the following Sites: 6-145-1, 26-114-1, 52-102-1 and 55-112-1.

Five semivitreous earthenware sherds decorated with a blue flow transfer-printed motif were recovered from Sites 55-112-1, 13-170-1, 47-129-10 and 53-107-1. Both documentary and archeological evidence place the introduction of this ware into the North American markets as dating to 1844, remaining as a popular form until ca. 1855 (Collard 1967:118).

A relatively recent semivitreous pitcher fragment was recovered from Site 36-107-2. This specimen exhibited an extremely dark exterior blue glaze and possessed a black transfer-printed manufacturer's mark of the Hall China Company of East Liverpool, Ohio (Figure 10). This particular mark was in use by the Hall Company from 1903 to 1960 (Lehner 1978:46).

Two semivitreous sherds were recovered from Site 12-133-2 that exhibited a blue floral transfer-printed design. Two green transfer-print sherds were recovered from Site 47-129-10.

A total of 23 vitreous paste, or porcelain sherds were recovered from 12 sites during the survey (Table 7). These included two white paste sherds associated with 18-108-1. The sherds represent a shaving mug upon which an overglaze handpainted script in purple has been applied, apparently identifying its owner, "N.Y. Regu...". In addition to this specimen, three examples decorated in handpainted motifs were recovered from 15-102-1 and 48-115-3. The two sherds associated with the former site represent a single bowl form decorated with a gold overglaze floral scroll and geometric designs and exhibiting a series of floral pattern glaze scars indicative of overglaze painting. The single sherd collected from 48-115-3 consists of a slightly damaged squat shaped container possessing a small apurture on a dome-shaped top. This specimen measures 4.8cm in height and 7.1cm square at the base and is decorated with an overglaze painted sea and junk motif in pink, purple and black colors. This piece is undoubtedly of Japanese manufacture and represents a variety of ware which became readily available in North America during the post-World War I period.

Five blue transfer-printed underglazed sherds were recovered from Site 14-144-1 and are also reminiscent of Japanese porcelains which served as a common replacement for the previously popular German manufactured wares during the post-World War I period. An undecorated sherd from Site

36-107-2 was pierced along the rim for suspension of a prism suggesting its function as a lamp shade. One sherd with an overglazed gold print pattern was recovered from Site 06-180-11.

Throughout the first half of the present century, the domestic market for porcelain was almost entirely supplied through imported wares (Newcomb 1947). Prior to World War I this trade appears to have been largely dominated by articles of German, Austrian and French manufacture. During the war the German sources of production were eliminated from the domestic trade. The resulting void was quickly filled, however, through the expansion of the Japanese industry. Although subjected to increasingly higher tariff rates, these wares obtained a dominant position in the American market. This was primarily due to the support given by the Japanese government to this home industry, coupled with the devaluation of the yen in 1931 and the existence of an increasing wage differential between American and Japanese workers. By 1937 it was estimated that approximately 88 percent of all porcelain imports into the United States were of Japanese manufacture (Newcomb 1947).

The rest of the ceramic samples collected during the survey consist of Colored Bisquit "utilitarian" wares. The largest segment of these consisted of stonewares. Paste

colorations of these sherds ranged from grey to tan, brown and yellow.

Among the stoneware samples, only four specimens exhibited the exterior salt glaze finish normally associated with the earlier dated varieties of this ware. The majority of the recovered samples consisted of either white, grey or brown glazed sherds indicative of a late nineteenth to early twentieth century period of manufacture (Appendix D).

An additional unglazed sherd, associated with 48-115-3, was recovered during the survey. This specimen may be of local production exhibiting an unglazed light yellow bisquit exterior and a brown slip interior. Two specimens, collected from 03-183-1 and 52-102-4, are finished with an exterior salt glaze. The former example exhibits a light colored yellow body over which both white exterior and brown interior slips have been applied. The exterior slip further exhibits a corrugated or orange peel effect characteristic of salt glazing. The specimen recovered from 52-102-4 possesses a gray paste body, a brown slip interior and a clear salt glazed exterior. A single brown slip exterior-interior glazed sherd was also collected from 56-112-1.

The dominant stoneware variety encountered during the survey was a white slip glazed variety popular through the late nineteenth and early twentieth centuries. An example of this variety is shown in Figure 9. This specimen was manufactured by the Union Stoneware Company, Red Wing, Minnesota. Although contemporary advertisements refer to this ware as being "White", glaze coloration generally runs the gamut from an extremely light toned grey to a light bluish tint. This tendancy may have led to the designation of such wares under the headings of "Bristol" or "Delph" glazed. The later appellation quite possibly takes into account the strong use of blue as a decorative applique (Kresge 1913).

With few exceptions, the sherds collected during the survey exhibit a light gray toned interior-exterior slip glaze over a colored yellow body. However, variations in this form do occur. The five sherds collected from Sites 44-109-1 and 46-124-1 exhibit a slightly bluish tone in glaze coloration. Two specimens collected from 04-165-1 are glazed with a light brown colored body. This latter color variation may be due to paste composition or to differences in firing temperature such as might be related to kiln placement. This situation is further suggested upon examination of the three specimens recovered from 15-102-1. All three examples exhibit a variable paste coloration which

appears to exhibit a brown tone ranging towards yellow along the outer portions of the vessel walls.

Among the specimens recovered from 15-102-1 was a single fragmentary example marked with a blue stenciled maple leaf decoration with the "WE..." placed within the motif. An additional sherd collected from 16-122-1 and a yellow bisquit was similarly decorated and marked with a partial script,"...ARE Co.". The Weir Pottery Company of Monmouth, Illinois, was incorporated by William Weir. The Weir Company was one of several companies that merged to form the Western Stoneware Company in 1906 (Stewart and Cosentino, 1977).

A sample of two unglazed cotta or red ware sherds were collected from Site 52-102-1 and may be identified as flower pot fragments.

Besides the above mentioned earthenwares, six clay smoking pipe fragments were also recovered during the survey from Sites 4-153-1, 6-145-1, 36-107-2 and 47-129-1. All of these specimens exhibited ovoid stem forms, a pattern which appears to be largely assignable to a post 1850 context (Martinez n.d.). Actually, the ceramic associations of all three sites are clearly indicative of a post 1900 period of utilization. One of the two marked stem fragments recovered from Site 6-145-1 (Appendix D) has been identified

as a Woodstock pipe manufactured by McDougall in Glasgow. The most likely date of manufacture would be between ca. 1875-1885 (I. C. Walker 1971).

Other miscellaneous finds included five clay marbles from Sites 32-109-3 and 53-107-1 and one china doll fragment from Site 50-119-1.

METAL

The metal artifacts collected consist of a sampling of diagnostic artifacts observed in the field and not the total metal inventory available.

At sites such as 26-114-1, Moore Farm, the extent of metal artifacts lying on the surface is so great that it would not be practical to collect, process and store all of them. Therefore, only potentially diagnostic pieces were collected. There was evidence at 26-114-1 and 6-145-1 that unauthorized personnel had been excavating, most probably with the aid of a metal detector since most of the surface material consisted of metal objects.

This artifact class can be broadly divided into two major categories consisting of those items which are either composed of iron, or utilize iron in alloy composition (ferrous) (Appendix E), and those which do not (nonferrous). Only two buttons recovered from 15-102-1 form the latter group.

Of the 161 samples collected, the largest portion, approximately 44 percent, consisted of nails and nail fragments. The majority of these (60 percent) were composed of the machine square cut variety. Twenty-six (39 percent) specimens were of drawn wire composition. One nail specimen recovered from 17-123-2 is flat, or rectangular, in cross section suggesting its probable use as a farrier's shoe nail. The majority of the square nails collected were fragmentary and heavily corroded examples. The grain of these nails appears to generally follow thin lengths, a feature indicative of a post-1830 period of manufacture.

The majority of the wire nail samples recovered consisted of relatively large flat headed varieties. These ranged in size from as little as 6.5cm to as much as 12.6cm.

While wire nails were apparently being manufactured in the United States as early as the 1850's, it was not until about 40 years later that they began to achieve a dominant position over the square cut varieties. According to Nelson, some builders well into the present century continued to prefer the cut over the wire types (Nelson 1962). This phenomenon may be represented in the nail sample recovered from the Berrien Springs jail site in southeastern Michigan. In Feature 4 of this site, which dated to the ca. 1890-1910 period, less than one percent of the nail sample consisted of the wire variety (Demeter and Lowery 1977).

In addition to the above nail samples, 15 specimens of spikes were located. Of this sample 12 were located at Site 55-111-1, Nevers Dam. These examples were made not because of their diagnostic characteristics, but more as a type collection from a site that was known to have been constructed in 1870 by the St. Croix Dam and Boom Company and was actively used until 1912. This sample consisted of the following: one 16 inch x 5/8 inch square pointed, flat-topped specimen, two 14 inch x 5/8 inch square pointed, flat-topped specimens, eight 10-1/4 inch by 1/2 inch square, pointed, round (rose head) specimens, one 10-1/4 inch x 3/8 inch square, pointed round (rose head) specimens.

A total of four brass objects were located during the survey (Appendix E). A brass fragment was found at 52-102-1, S.W. Slack House, and a brass harmonica reed board was found at 32-109-1, Dogtown Village.

Additional brass objects were located at Sites 06-180-1 and 55-111-1. A .22 caliber bullet was located at Site 06-180-1 and an additional harmonica reed board was located at 55-111-1.

A total of fifty-seven additional metal arfifacts were located during the survey (See Appendix E for a list of these). Only the most diagnostic will be described below.

Two iron objects which appear to be of hand wrought manufacture were collected from 15-140-1 and 23-134-1 and are classified as hinge and pintle in Table 7. The specimen recovered from the former site consists of a length of bar iron measuring 12cm in length and 1.4cm in diameter. One end of the bar has been flattened and looped as if for placement on a pintle. The opposite end is eyed in alignment with the up-down direction of the hinge loop. The specimen recovered from 23-134-1 can be tentatively identified as a pintle, and measures approximately 12.4cm in length. The anchor portion of this specimen is rectangular in cross section and tapers to a point. That portion of the pintle utilized for hinge attachment exhibits a circular cross section, with the bend or elbow exhibiting a pinched or triangular form.

Two fiddle shaped spoons were collected from 18-108-1 and 48-108-1. Both exhibit heavy oxidization and are tin plated. The specimen recovered from the former site measures 15.2cm, while the latter is 21cm in length. This style of spoon was extremely popular throughout the early 1800's and continued to be manufactured into the present century. The 1913 Kresge catalogue offered both "plain pattern" spoons and forks of this style to its customers. These were advertised as being "dependable...for every day use" and cost five cents for two forks, table or dessert spoons, or five cents for four teaspoons (Kresge 1913).

A knife handle - blade fragment collected from 03-183-1 is also similar to sets advertised by the Kresge Company. This specimen is of a riveted wood handle construction, with the distal end being fixed in place by a crimped steel handle guard. Items of this variety were offered by Kresge in knife and fork pairs costing 20 cents (Kresge 1913:97).

A total of five tinware artifacts were recovered as a result of the survey. This sample included three tin pressure sealed can forms, the lid of a snuff tin, and a small bowl form. The last object, collected from 03-151-1, measured 6cm in height, 11cm base diameter expanding to approximately 16.2cm in rim diameter. The vessel walls are of two piece construction, being joined by two folded vertical seams. The base is similarly crimped, while the rim has been reinforced with a wire insert along the exterior wall.

Among the three tin cans collected during the survey, one example was recovered from 04-165-1. This specimen measures 11.7cm in height and 8.5cm in diameter. Both ends of the can are extant, one of which has been opened by a hand opener exhibiting a 3/4 circular cut along the inside of the seam margin. All seams have been mechanically folded and are unsoldered. In construction this can is of the same form of those presently in use. The modern variety of

preserve can was first introduced by the Sanitary Can Company of New York in 1904. By the post-World War I period, it had generally replaced the earlier, open top forms (Clark 1977).

This latter variety is also represented in the artifact sample, being associated with 17-123-2. The specimen recovered from this site measures approximately 11.8cm in height and 8.5cm in diameter. Both end flaps are unfolded and have been soldered in place. A hole for insertion of foodstuffs is extant on the undamaged end of the can. After the filling process was completed, a circular disk was placed over the opening. During the boiling process, steam escaped from a small pinhole within the disk which was then soldered shut (Figure 10). A storage can of similar design had been patented as early as 1810 and continued to be used throughout the nineteenth century until being replaced by the modern machine pressed forms during the early part of the present century (Clark 1977).

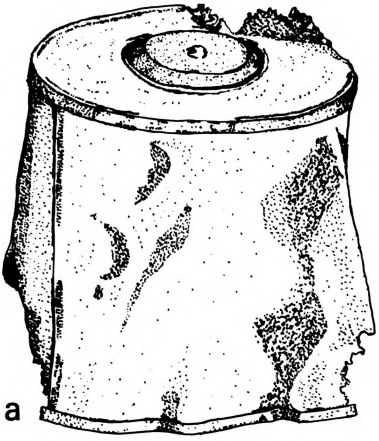
Another specimen collected from 15-102-2 can be identified as a coffee can measuring 12.5cm in height and 10.8cm in diameter. This can is painted green with a gold and white stenciled label, "M.J.B./safety sealed/COFFEE". The accompanying instructions for coffee preparation and can storage have been largely obliterated by oxidation.

FIGURE 11

METAL ARTIFACTS - PHASE II

Metal

Site No.	Description
a. 17-123-2	Preserve Can
b. 15-102-1	Button; "Towers Wire Fastened"



a

b

FIGURE 11

metal artifacts-phase II

Besides the above tinplated wares, a single enameled metal cup measuring approximately 11.5cm in rim diameter was collected from 18-102-2. Scaling of the enamel surface on the cup exterior reveals a blue enamel which was utilized as a primary undercoating. Only a small part of this primary treatment remains exposed, along the exterior of the rim, as a blue line decoration. Items of this variety were utilized both as utilitarian and kitchen wares. The 1913 Kresge catalogue devotes a full page to these wares which are listed as "Genuine Swedish White Enamelware". All of the examples illustrated were offered at a cost of ten cents, a price which was double the expense of similar plain white earthenwares (Kresge 1913). Because of the restrictions imposed by the McKinley Tariff of 1891, one can expect that most of these wares were marked as to the country of manufacture. Although the example collected during the survey has a damaged base, the author is aware of several other specimens which are marked with printed light toned blue printed circular cartouche within which the legend "K.E.R." and "Sweden" appear in conjunction with an abstract pattern, possibly representing a pot lid and cup, containing the Swedish flag. Similarly decorated wares have been recovered from the Bill Wilson Store (45AS87A) at Silcott, Washington. A saucer form (I22B) described in the report exhibited a manufacturer's mark "$\frac{T}{S}$ GERMANIA" (Adams et al. 1975:141).

Included among the ferrous metal sample was a Wisconsin vehicle license plate collected from 04-165-1. This specimen is rectangular in shape, measuring 36cm by 12.4cm, and possesses an impressed inscription, "B95-816/WIS/24".

A 1864 Indianhead penny was recovered from Site No. 47-129-10. It was found in association with wire cut nails which may or may not support this early date for this site.

Probably the most interesting metal artifact collected during the survey was a strike-a-lite located from Site 47-129-9. This specimen weighs 41.1mm and measures 8.72cm in length, 3.94cm in width (or height), 1.44mm in striking-edge width, and 4.1mm in striking-edge thickness. This specimen most closely resembles type Series A Two-Part Form located at Fort Michilimackinac (Stone 1974). Strike-a-lites were an important trade-good item throughout both the French and British periods of occupation. This early date for this Site 14-129-9 is supported by the fact that this strike-a-lite was found in association with prehistoric ceramics. Unfortunately, the ceramic specimens recovered were too fragmentary to identify.

FAUNAL

A total of 238 pieces of faunal debris was recovered from 15 separate sites (Table 4). The largest single group (N=97) has been identified as deer and was located at Sites

TABLE 4

FAUNAL REMAINS

	07-104-1	18-108-2	46-141-1	48-115-1	51-102-1	51-102-2	56-103-2	41-129-1	47-129-4	47-129-1	47-129-10	54-103-1	47-129-8	06-180-1	28-101-2	TOTAL
FAUNAL																
Mammal-Deer	89	--	--	5	--	--	--	2	1	--	--	--	--	--	--	97
Mammal-Unknown	--	2	6	6	2	--	1	3	--	1	--	--	--	1	1	23
Mussel Shells	--	--	2	--	33	20	--	--	23	--	10	--	6	--	--	94
Teeth	--	--	--	--	--	--	--	4	--	4	--	--	--	--	--	8
Burnt Bone	--	--	--	--	--	--	--	13	--	1	--	2	--	--	--	16
TOTAL	89	2	8	11	35	20	1	17	24	6	10	2	6	1	1	238

07-104-1, 18-115-1, 41-129-1 and 47-129-4. The next numerous category located was mussel shells (N=94). Mussel shells were recovered from Sites 46-141-1, 51-102-1, 47-129-4, 47-129-10, and 47-129-8. Interesting enough is the fact that all sites on which mussel shells were located and three of the four sites where deer remains were recovered are located in the extreme southern portions of the riverway in an area of maple-basswood and northern floodplain forest.

Additional faunal remains located consisted of unidentifiable mammals, teeth, and burnt bone.

CHAPTER 7

CULTURAL HISTORY

One of the goals of the multi-staged St. Croix Scenic Riverway project is that of cultural history, a reconstruction of the sequence of cultural events placed within a space-time framework. An additional goal of the project is to address the cultural ecological relationships interacting within the St. Croix River System, including the changing man-land relationships for both prehistoric and historic peoples. The following cultural history is based on the limited data available through surface collection and shovel testing. The goal of the project was the location of sites; therefore, no extensive testing or excavations were undertaken. Undoubtedly, the cultural reconstruction presented will change as more research is undertaken within the riverway.

The total survey of the riverway (99 percent) resulted in the location of 63 sites with prehistoric components. The majority of these consisted of small prehistoric sites from which little information can be derived, except through additional investigations. This additional information would produce the data necessary to address more specific research questions for the riverway. The majority of the historic sites located (163) tentatively date to the end of the

nineteenth century and the early part of the twentieth century (ca. 1890-1950). The locations of these sites are shown in Appendix B.

While these sites are important in understanding and reconstructing the complete history and development of the St. Croix River Valley, they too, provided little information readily available for the reconstruction of the cultural history of the St. Croix River Valley.

Specifically, the survey failed to locate any evidence that might indicate the existence of Paleo-Indian occupation within the riverway. This is not surprising considering the nature of most Paleo-Indian finds. These usually consist of isolated artifact finds or thinly scattered short-term occupation sites. This is just the type of site that would be most difficult to locate in the heavily vegetated condition that characterizes the riverway.

The earliest record of human occupation documented for the area is the Archaic Period. Of the 63 prehistoric sites located within the riverway only six have been positively assigned to the Archaic Period. These include one site located during the Phase I survey (04-150-1) and three sites (03-103-1, 13-126-1, and 17-126-2) located during the Phase II survey. All of these sites are located within the drainage

of the Namekagon River and within an area characterized by Great Lake pine forests and sandy outwash plain soils.

Two additional Archaic Sites (58-107-1, 58-122-1) were located during the Phase III survey. Both of these have possible associations with the Burnt-Rollways Phase as defined by Salzer (1974). These two sites are located within the drainage of the St. Croix Riverway and within an area characterized by a maple-basswood forest.

The Archaic period within the St. Croix region is generally viewed as a period of normalization of the yearly seasonal cycle, which produced specific resource availability at critical times throughout the seasonal round of subsistence activities. The northern adaptation appears to be based on the hunting of large mammals with the addition of seasonal fishing. Four of the Archaic sites located to date probably reflect this northern adaptation with subsistence activity based on the hunting of large mammals that existed within the Great Lake pine, forest and the utilization of the aquatic resources available within the Namekagon River during certain periods of the year. While further research is needed to test this contention, it may be possible to conjecture that the located sites may have been spring, summer, fall campsites involved with fishing activities on the river. Within the same mode of thought one would expect the two Archaic sites located in the southern portion

of the study area to have a seasonal subsistence activity with a heavier reliance on the collection of wild plant food associated with the maple-basswood forest that characterized the southern portion of the river.

Eighteen of the 63 prehistoric sites located during the survey can be assigned to the Woodland Period. Eight of these were located during the Phase I survey, three during the Phase II survey and seven during the Phase III survey.

Sites 51-102-1 and 47-129-3 have been dated to the St. Croix Phase or transitional period between the Middle and Late Woodland period. Site 58-122-1 has been dated to the Middle Woodland period. Sites 37-120-1 and 54-103-1 have been assigned to the Black Duck Phase of the Late Woodland Period. The following sites have been assigned to the general Late Woodland classification: 36-107-5, 36-107-2, 21-135-1, 21-115-1, 46-141-1, 52-102-3, 47-129-9, 47-129-8, 05-147-1 and 07-123-1. Sites 40-104-1 and 49-102-1 have been identified as Woodland occupations according to Minnesota state records, but no diagnostic artifacts or material were recovered during survey of the sites. Thirty-nine percent (7) of the Woodland sites located were contained within an area of Great Lake Pine Forest, 39 percent (7) were located in maple-basswood forests and 22 percent (4) were located in the northern floodplain forest.

One site, 13-169-2, can be assigned to an Upper Mississippian occupation or influence. However, this is based on the recovery of one shell-tempered pottery sherd and should be considered tenuous.

The remaining 39 sites inventoried during the survey could not be assigned to any general or specific cultural or temporal period. Most of the sites were identified by a scattering of lithic materials; more research is needed in order to fully evaluate these sites and to make any judgments as to cultural or temporal affiliations.

A total of 163 historic sites have been located within the riverway. Sixty-one of these were located during the Phase I study, 41 during Phase II and 61 during Phase III.

The earliest of these sites are associated with the exploitation of furs by various groups of Europeans. Fur trade was established on the Namekagon River in 1784 and later on the St. Croix River. Several sites associated with the fur industry were located during the Phase I survey (13-179-1, 51-102-1). No additional sites of this type were located during the Phase II survey. However, during the Phase III study a strike-a-lite was located on Site 47-129-9 in association with prehistoric ceramics. It is possible that this site may represent an early contact site associated with the fur trading industry.

With the decline of the fur industry within the study area, lumbering became increasingly important along both the Namekgaon and St. Croix Rivers. The Phase I survey located 20 sites associated with lumbering activities. The Phase II survey located seven additional sites associated with the lumbering industry. Phase III located 35 sites associated with this activity. These sites include nine which have been identified as logging camps. Forty-nine have been identified as dams, cribbing or rock alignments.

One site is a dam and house site, while three sites have been identified as mills associated with the lumbering era. Most of the lumbering sites are located in the upper reaches of the riverway along the Namekagon and the northern portions of the St. Croix River. These sites are generally associated with lumbering of the Great Lakes pine forests, when the river was the primary means of transportation. Very few lumbering sites were located in the southern portion of the St. Croix Riverway where vegetation is primarily maple-basswood. Those sites of this type located in the southern portion of the St. Croix river are limited to dam and cribbing structures that were probably utilized to control the flow of logs and water within the river.

The recovered cultural material associated with the remainder of the sites located reflects an occupation of the riverway during the period from ca. 1850-1950. The

majority of recovered cultural material falls primarily within the latter half of this range. These sites are largely represented by randomly dispersed midden concentrations which occur as shallow refuse pits or sheet deposits sometimes associated with structural depressions. The majority of the sites with a high artifact yield are assignable to a post-1890 context.

Historically, the economic strategy of this later period represents an initial intensification of lumbering activities followed by the development of the region's agricultural potential. Agricultural activities continued in the area until a post-1940 period when most of the agricultural lands were abandoned; the area reverted back to its natural stages and recreational activities increased. This settlement pattern led to a gradual increase in population densities and further elaboration of communication and transportation networks. The creation of new road networks and the further emphasis of the railroad system had the immediate effect of allowing a far greater transportation of imported and eastern manufactured goods into the area, a fact which is readily discernible in the archeological record.

Among the more apparent transitions which occurred during this period of population expansion is a marked increase in the amount and variety of ceramic tableware associated with the later sites. Prior to this period it

was extremely probable that the preferred, or at least more readily available, table service consisted of the more durable and cheaper enameled metal ware and wooden wares. Such a pattern has been postulated for the economically and geographically isolated communities of early nineteenth century north central Ohio. It was also in evidence during surveys conducted by Commonwealth Associates at the early twentieth century Finnish settlement of Johnswood on Drummond Island in northern Lake Michigan (Miller and Henry n.d., Weir and Demeter 1975). Although significant amounts of enameled ware were observed during the survey, relatively few examples were collected due to both difficulty in transport and the relatively meager amounts of information which such material presently offers. It should also be noted that the bulk of these wares recovered in the field were almost entirely associated with the post-1890 occupation areas. The fact that few examples were identified from earlier site areas seems to demonstrate a heavy preference for the use of wooden wares which may have been produced locally in conjunction with the lumber industry. It is highly unlikely that this type of material would remain preserved and show up in the archeological record. However, it is impossible to render any judgments relative to this problem solely on the bulk of negative archeological evidence.

The historic earthenware collected during the project appears to provide some evidence for sequential patterning

of settlements. This patterning becomes particularly evident through the distribution of the semi-vitreous or iron stone-like ware which can generally be attributed to a pre-1900 context. The distribution of semi-vitreous material indicates a clear modal shift in the occurrence of soft white paste and semi-vitreous earthenware. A clear drop in the occurrence of the latter ceramic variety is indicated at those sites situated north of survey Segment Number 49. The high frequency of soft-white paste collected from most of the survey area is suggested for a later period of intensive land use which is attributable to a post-1900-1910 context.

CHAPTER 8

SETTLEMENT MODEL

One of the goals of the St. Croix project was to provide a settlement model for the Riverway.

The total number of sites located in the riverway is 217 (Appendix A). For planning purposes the Riverway have been separated into areas of high, medium or low site densities. Areas of high site potential are subregions with a density of .005 to .007, or approximately 3 to 4 sites per square mile. Subregions 13, 15 and 18 are included in this group, areas of medium potential consist of those subregions with .0020 to .0049 sites per acre or one to three sites per square mile. The average site density for the entire area is slightly more than two sites per square mile. Those subregions with a medium density include 2, 3, 4, 10, 11, 12, 14, 16, and 17. Areas of low site density are those which contain fewer than .002 sites per acre, or less than one site per square mile. One subregion, No. 6, contains no evidence of human habitation. Subregion No. 11 was completely surveyed during the Phase II survey and found to contain no sites. However, when the area was visited by canoe during

the Phase III survey, four sites associated with logging activities were located in the river itself. The finding of these sites moved subregion No. 11 from a low density classification to a medium density classification. Additional subregions with low site density include numbers 1, 5, 6, 7, 8 and 9. A summary of this data by subregions is contained in Table No. 5.

The results of the survey provide us with the means for making statements as to the total pattern of historic and prehistoric settlement along the St. Croix National Scenic Riverway. The area of highest overall site density is in maple-basswood or northern floodplain forest areas with productive soils, primarily in areas with more than 120 frost-free days.

This area shows the highest density of pre-1900 historic sites and prehistoric sites associated with the Woodland Period. The areas with the lowest site density are marked by poorer soils, northern hardwoods or conifer cover, and are primarily located in areas of fewer than 120 frost-free days. Sites associated with this region consist primarily of historic sites related to lumbering activities and prehistoric sites associated with the Archaic Period. Overall site density is greater in the lower portions of the Upper St. Croix River than in the upper portions. This is

TABLE 5

AREA DENSITY

	High Potential	Medium Potential	Low Potential	Total
Area Acreage	6,295	41,521	15,028	62,844
% Total Area	10	66	24	100%
Number of Sites	42	156	19	217
Percentage of Sites Located	19	71	10	100%

viewed as being consistent with the even greater site density that is known for the lower St. Croix area.

PREHISTORIC SITE DISTRIBUTION

The three Phases of the project resulted in the location of 63 prehistoric sites in the riverway. The survey uncovered no evidence of large-scale prehistoric utilization of the riverway. Most of the sites located that produced evidence of prehistoric occupation yielded only scattered and non-diagnostic chippage. No evidence of Paleo-Indian occupation was located within the riverway. Only six of the sixty-three sites are considered Archaic. This determination was made on the recovery of few diagnostic materials and should be considered preliminary until further research can be undertaken to substantiate their temporal placement.

Eighteen sites have been classified as Woodland on the basis of their producing prehistoric pottery or diagnostic lithic materials. Thirty-nine sites were identified as indeterminate.

One Woodland site was identified on the presence of a shell midden but no cultural material was located. On the whole, the survey recovered very little diagnostic material. The lack of diagnostic material recovered is probably due in part to a combination of small sites with low artifact

densities and the type of survey technique used to locate these sites in areas of dense vegetation.

The distribution of prehistoric sites in the study area, based on a combination of the Phase I, II and III survey data, is presented in Table No. 6. The survey information produced a site density of 63 prehistoric sites for the entire riverway or a site density of .001 sites per acre, which is just under one site per square mile.

The prehistoric site distribution is significantly different from the total site distribution pattern for the riverway. Overall prehistoric site densities of the St. Croix study area are greater along the upper portions of the river. The majority of all prehistoric sites are located in areas of northern hardwood and Great Lakes pine forest, in areas with a growing season of less than 120 frost free days. While the majority of prehistoric sites are located in the upper portion of the riverway, there are indications that a pattern exists where Woodland sites are located in the lower portions of the riverway in areas of potentially favorable agricultural soils, and a longer growing season. Over 60 percent of the Woodland sites are located in the lower portion of the study area.

Several general conclusions can be drawn from these data. The St. Croix was known to have been a buffer zone

TABLE 6

PREHISTORIC SITE DISTRIBUTION BY COMPONENT

Subregion	Total Acres	Total Area Sampled	Archaic Sites	Woodland Sites	Indeterminate Sites	Total
1	2,203	2,203	0	0	0	0
2	19,393	19,191	2	1	4	7
3	9,652	9,776	2	3	14	19
4	1,926	1,926	0	0	1	1
5	2,969	2,969	0	0	1	1
6	477	477	0	0	0	0
7	2,233	2,233	0	1	0	1
8	2,291	2,291	0	2	1	3
9	5,056	5,056	0	1	1	2
10	2,844	2,844	0	1	2	3
11	1,142	1,142	0	0	2	2
12	2,776	2,776	0	0	2	2
13	3,089	3,089	0	6	5	11
14	1,908	1,908	0	0	1	1
15	2,526	2,526	0	2	5	7
16	1,200	1,200	0	0	1	1
17	479	479	0	0	0	0
18	680	680	2	1	0	3
TOTALS	62,844	62,566	6	18	40	64

between groups with different adaptive patterns in the historic period and the same may have been true for the prehistoric period. This may account for the small number of prehistoric sites located within the riverway. The survey failed to locate any evidence that might indicate the existence of Paleo-Indian occupation within the study area. Archaic occupations are concentrated in the upper portion of the study area, primarily in subregions 2 and 3, the largest and second largest of the subregions. It is likely that these sites are transient summer season sites of groups with larger winter villages outside of the study area.

The majority of Woodland sites have been located in the lower portion of the riverway between St. Croix Falls and Grantsburg. These are probably village sites associated with the more favorable environmental conditions that exist in the lower riverway. Woodland sites located above Grantsburg are small sites most likely associated with seasonal hunting or collecting.

HISTORIC SITE DISTRIBUTION

Historic archeological sites were found to be more numerous in the study area than prehistoric sites. Table No. 7 presents a summary of historic distribution, by site types and subregion, along with site density by subregion. The table includes information acquired during the Phase I, II and III portions of the survey.

TABLE 7

HISTORIC SITE DISTRIBUTION

Subregion	Total Area	Total Area Sampled	Trading Posts No.	Logging Sites No.	Native American No.	Euro-American Settlement No.	Ferries and Bridges No.	Unique No.
1	2,203	2,203	0	2	0	1	0	0
2	19,393	19,191	0	39	3	11	1	3
3	9,652	9,776	1	9	0	10	1	1
4	1,926	1,926	0	2	0	4	1	0
5	2,969	2,969	0	0	0	3	0	0
6	477	477	0	0	0	0	0	0
7	2,233	2,233	0	0	1	0	0	0
8	2,291	2,291	0	0	2	0	0	0
9	5,056	5,056	0	5	1	3	0	0
10	2,844	2,844	0	1	0	0	1	5
11	1,142	1,142	0	5	0	4	1	0
12	2,776	2,776	0	1	1	4	0	1
13	3,089	3,089	0	5	0	8	1	0
14	1,908	1,908	0	1	0	4	0	1
15	2,526	2,526	1	1	0	6	2	0
16	1,200	1,200	0	0	0	3	0	0
17	479	479	0	0	0	0	0	0
18	680	680	0	0	0	1	0	1
TOTALS	62,844	62,566	2	71	8	62	8	12

The survey resulted in the location of 163 sites with historic components. This amounts to a density of .0026 sites per acre or almost two sites per square mile.

While the Phase I survey located the remains of two trading posts, the Phase II and III surveys failed to locate any evidence indicating the existence of additional trading posts.

Historic sites associated with the lumbering era are the most numerous archeological features in the study area. To date, 71 sites have been located of this type. The majority of these sites are located in the upper portion of the study area in regions associated with a Great Lakes pine forest cover.

The Phase I survey located the remains of seven sites associated with Native American villages or cemeteries. The Phase II survey failed to locate any sites of this type. The Phase III located one site that may be of this type. These sites are again associated with the upper portion of the riverway in areas less favorable for occupation but ones which may have been more readily available to Native Americans. It is important to note a possible correlation between pre-historic and historic Native American sites. This may, in fact, reflect a traditional utilization of certain areas

or a preference for site locations in certain micro-environmental settings not identified.

Euro-American settlements are among the most numerous type of historic sites located along the riverway. A total of 62 Euro-American settlements have been located. These sites are concentrated in two areas; 1) near the logging sites in the upper portion of the riverway, and 2) below Grantsburg in more favorable agricultural localities. In addition, there appears to be a shift in the temporal placement of these sites. Earlier sites appear to be located in the lower portion of the study area with later sites located in the upper portion.

The survey located the remains of eight ferries and bridges. Seven of the eight sites of this type were located during the Phase I survey. This was a result of the fact that most of the areas with mapped roads leading to ferries and bridge sites were traveled or visited during the Phase I survey.

The category of "other sites" contains a variety of unique sites. A total of 12 such sites have been located.

As a result of the survey we have located a total historic site density of 163 sites. This includes 2 trading

posts, 71 logging sites, 8 Native American sites, 62 Euro-American settlements, 8 ferries and bridges, and 12 unique sites.

The historic archeological sites located in the riverway appear to be distributed in different but predictable patterns according to site types. Trading posts are distributed evenly within the study area with one being located in the upper portion and one in the lower portion of the riverway. Ferries and bridges are also fairly evenly distributed within the study area. There would have been no advantage in clustering sites of this type, and spacing might be expected as a rule. Sites associated with logging activities are concentrated in the upper portion of the riverway, in areas with the greatest natural potential for logging activities. Native American sites tend to be located in areas less favorable to agriculture, generally in the upper portion of the riverway. Euro-American sites have a bi-modal distribution, with one cluster in the upper portion of the river near the logging region and a second in the area of more favorable agricultural potential below Grantsburg. The unique sites appear to be randomly distributed.

CHAPTER 9

SAMPLING MODEL

The original research design for the St. Croix project called for an evaluation of sampling as a viable planning technique. However, considering the fact that the Phase I (20 percent), Phase II (40 percent), and Phase III (40 percent) surveys were non-random in nature, the data did not lend itself to analysis according to probability theory. As an alternative the following sampling experiment has been undertaken. The entire St. Croix study area was divided into uniform 40 acre parcels. However, because of some irregular parcels a number of acres had to be eliminated. Table 8 shows the number of actual 40 acre parcels within each of the 18 subregions described in Chapter 2. In other words, 57,400 acres of the 62,800 acres in the riverway could be evaluated using sampling techniques. In the following section various random sampling fractions will be evaluated in order to see which fraction would provide the best predictor of the entire population of the riverway. Within each experimental sample actual sample units (40 acre) were picked by a standard table of random numbers.

Each fraction will be analyzed by using a chi-square statistic. Chi-square will be used qualitatively to evaluate

TABLE 8

SAMPLING UNITS

Subregion	Number of 40 acre parcels
1	48
2	460
3	80
4	39
5	76
6	12
7	59
8	56
9	135
10	81
11	29
12	79
13	87
14	58
15	69
16	36
17	15
18	16
TOTAL	1435

whether certain of the samples are or are not accurate population predictors.

Blalock (1960) has described chi-square as a test which can be used to evaluate whether or not frequencies which have been empirically obtained differ from those which would be expected under a certain set of theoretical assumptions. Mueller (1974) has shown the utility of using chi-square for the analysis of archeological sampling. For the purposes of this project,the empirically obtained frequencies are those sites found in each of the experimental samples taken.

The expected frequencies are those represented by the population of 217 sites (63 prehistoric and 163 historic components) located as a result of the 100% sample minus those sites located in those parcels eliminated because of irregular shapes. The actual frequency of sites within the 1435 survey parcels is 208 (59 prehistoric and 149 historic components). As suggested by Mueller (1974) a 0.05 level of probability will be used for the analysis.

For each of the experimental samples chi-square will be calculated according to the following formula:

$$x^2 = \frac{(fo-fe)^2}{fe}$$

Where fo = the actual number of sites observed during a particular sample and fe = the expected number of sites we would theoretically expect to find. This expectation is theoretical because it is based on the number of sites that would have been found in a single field season if sites were distributed and recorded in proportion to their occurrence in the total 100% population. This expected dimension of the chi-square analysis was implemented by multiplying the experimental sampling fraction for that group by the total population of sites in those same categories. This reduction has the effect of minimizing the tendency of chi-square to yield significance with large frequencies (Blalock 1960).

In addition to the examination of the complete sample, the population was divided into historic and prehistoric sites in order to see if the site discovery techniques differed according to the nature of the resources. The site population was also divided again according to environmental subregions as described in Chapter 2. Initial chi-square testing was done utilizing all 18 environmental subregions. However, due to the relatively low site densities for the area, 14 of the 18 subregions had an expected frequency of less than five. As discussed by Blalock (1960: 285) the chi-square test requires a relatively large N because of the fact that the sampling distribution of the test statistic approximates the sampling distribution given in the chi-square table only when N is relatively large.

Blalock suggests that whenever several of the expected frequencies are in the neighborhood of 5 or smaller, it is advisable to make some kind of modification, and if there are a large number of small cells, the only practical alternative is to combine categories in such a manner as to eliminate these cells. This is exactly what has been done for the following analysis. The eighteen subregions were collapsed into four subregions. By utilizing the presettlement vegetation as described in Chapter 2 it was possible to combine subregions 2 with 3, 6, 7 and 8 (Great Lakes Pine); 1 with 4 and 5 (Northern Hardwoods); 9 with 10, 11, 12, 13, 16, 17 and 18 (Maple-basswood) and 14 with 15 (Northern Floodplains).

The chi-square analysis will test the following Null hypothesis Ho; the sample is representative of the total population at a 0.05 level of probability.

As can be seen from Tables 9, 10 and 11 the expected frequencies for a 5, 10 or 15 percent sample is too low in order to undertake a chi-square analysis. This is a problem that is not uncommon in areas of the Northern Great Lakes with known low site densities.

Table 12 presents the analysis of the experimental 20 percent sample. Based on the X^2 of 5.87 and a degree of freedom of 3 we can accept the Null hypothesis for this

TABLE 9

CHI-SQUARE ANALYSIS, 5 PERCENT SAMPLE
PREHISTORIC AND HISTORIC SITES

Subregion	O	N	sf	e	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
2,3,6,7,8	-	100	.05	5	-	-	-
1,4,5	-	13	.05	.65	-	-	-
9,10,11,12, 13,16,17,18	-	71	.05	3.55	-	-	-
14,15	-	24	.05	1.2	-	-	-
	-	208	.05	10.4	-	-	-

O = Prehistoric and Historic sites observed

N = Number of Prehistoric and Historic sites observed for the 100% survey

sf = Actual percentage of subregion surveyed

e = Number of sites expected to be located

TABLE 10

CHI-SQUARE ANALYSIS, 10 PERCENT SAMPLE
PREHISTORIC AND HISTORIC SITES

Subregion	O	N	sf	e	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
2,3,6,7,8	-	100	.10	10	-	-	-
1,4,5	-	13	.10	1.3	-	-	-
9,10,11,12, 13,16,17,18	-	71	.10	7.1	-	-	-
14,15	-	24	.10	2.4	-	-	-
	-	208	.10	20.8	-	-	-

O = Prehistoric and Historic sites observed

N = Number of Prehistoric and Historic sites observed for the 100 % sample

sf = Actual percentage of subregions surveyed

e = Number of sites expected to be located

TABLE 11

CHI-SQUARE ANALYSIS, 15 PERCENT SAMPLE
PREHISTORIC AND HISTORIC SITES

Subregion	O	N	sf	e	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
2,3,6,7,8	-	100	.15	15	-	-	-
1,4,5	-	13	.15	1.95	-	-	-
9,10,11,12, 13,16,17,18	-	71	.15	10.65	-	-	-
14,15	-	24	.15	3.6	-	-	-
	-	208	.15	31.2	-	-	-

O = Prehistoric and Historic sites observed

N = Number of Prehistoric and Historic sites observed for the 100% sample

sf = Actual percentage of subregion surveyed

e = Number of sites expected to be located

TABLE 12

CHI-SQUARE ANALYSIS, 20 PERCENT SAMPLE
PREHISTORIC AND HISTORIC SITES

Subregion	O	N	sf	e	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
2,3,6,7,8	24	100	.20	20	4	16	.8
1,4,5	5	13	.20	2.6	2.4	5.76	2.22
9,10,11,12, 13,16,17,18	11	71	.20	14.2	-3.2	10.24	.72
14,15	8	24	.20	4.8	3.2	10.24	2.13
	48	208		41.6			$X^2 = 5.87$

df = 3 $\quad$ 5.87 < 7.815

O = Prehistoric and Historic sites observed

N = Number of Prehistoric and Historic sites observed for the 100% sample

sf = Actual percentage of subregions surveyed

e = Number of sites expected to be located

survey. Stated more simply, a 20 percent random stratified survey of the St. Croix Riverway would have provided a sample that accurately represents the total population. The information presented in Table 12 represents an observed population of 48 consisting of both prehistoric and historic sites.

As can be seen from the above sample,the original stratification involved a complex system that took into account soils, vegetation and climatic zones. Because of the low site density present in the Riverway it was necessary to combine strata in order to undertake an accurate chi-square analysis.

As an alternative to this complex system it is suggested that a much simpler system be utilized. The obvious choices for the alternative system would be one based either on vegetation alone or soil classification alone. Either of these would provide a stratification of four or five cells vs. eighteen in the original scheme. The utility of such a system is obvious in an area with an anticipated low site density that characterizes the majority of the inland areas of the Upper Great Lakes region.

Vegetation was utilized in order to collapse the original subregions (18) into the four classifications used

in Table 12. The following five vegetation zones are found within the riverway: 1) Northern hardwood, 2) Great Lakes Pines, 3) Maple-basswood, 4) Northern floodplain, and 5) Conifer bogs. These are described in detail in Chapter 2. Because of extremely low site densities Conifer bogs was combined with Northern hardwoods for the analysis.

As stated earlier in this Chapter,a 20 percent random sample stratified according to vegetation would produce an accurate representation of the total population for the riverway.

For the purpose of experimentation,a hypothetical stratification was performed using soil types as the basis of stratification. Sevel soil types have been identified for the riverway. A complete description of these soils is given in Chapter 2. Again, because of the low density, it was necessary to combine some of the smaller soil types in order to get a high enough expected value for a valid chi-square analysis. For the stratification the following soil classifications were used: G and H in Wisconsin, Chetek-Onamia in Minnesota and the classification "all others" which contained the remaining four soil types, F and J in Wisconsin and soils Hayden and Milaca-Chetek in Minnesota.

The results of the hypothetical survey stratified on soils alone is presented in Table 13. The chi-square analysis for the combined prehistoric and historic sites shows that the sample would be representative of the total population.

We have shown that both a hypothetical 20 percent random survey stratified according to soils and a survey stratified according to vegetation would be representative of the total population. A much more important question is "given that a relationship exists, how strong is it?"

A common test of the strength of relationship based on chi-square is Pearson's contingency coefficient C^1 which is given by:

$$C^1 = C/Cmax = \frac{\frac{X^2}{X^2+n}}{\frac{t-1}{t}}$$

Pearson's C was performed on both the survey stratified according to vegetation and according to soils. Table 16 shows the strength of association for the sample when stratified according to vegetation zones. This value is .38.

The same test of strength of association was performed on the survey stratified according to soils. This data is

TABLE 13

CHI-SQUARE ANALYSIS, 20 PERCENT SAMPLE
SOIL TYPES, PREHISTORIC AND HISTORIC SITES

Soils	O	N	sf	e	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
G	15	68	.20	13.6	1.4	1.96	.14
H	21	71	.20	14.2	6.8	46.24	3.25
Chetek-Onamia	10	55	.20	11.0	-1.0	1.0	.09
All Others	2	14	.20	2.8	-0.8	0.64	.23
	48	208				X^2 =	3.71

df = 3 $\quad$ 3.71 < 7.815

O = Prehistoric and Historic sites observed

N = Number of Prehistoric and Historic sites observed for the 100% survey

sf = Actual percentage of Soil Classes surveyed

e = Number of Prehistoric and Historic sites expected to be located

presented in Table 14. The value for this survey is .32. As can be seen from Table 14, the overall highest strength of association is for the survey that was stratified according to the major presettlement vegetation zones.

It can be concluded from this data that, at least in the case of the St. Croix Riverway, a random survey stratified according to major presettlement vegetation zones would best fit the known low site density for the area and would prevent a common error of "over stratification".

TABLE 14

STRENGTH OF ASSOCIATION - VEGETATION AND SOIL ZONES

I. VEGETATION ZONES

$$C = \sqrt{\frac{X^2}{X^2+N}} = \sqrt{\frac{5.87}{53.87}} = .33$$

$$Cmax = \sqrt{\frac{t-1}{t}} = \sqrt{\frac{3}{4}} = .87$$

$$\text{Strength of Association} = C/Cmax = \frac{.33}{.87} = .38$$

II. SOIL ZONES

$$C = \sqrt{\frac{X^2}{X^2+N}} = \sqrt{\frac{3.71}{51.71}} = .28$$

$$Cmax = \sqrt{\frac{t-1}{t}} = \sqrt{\frac{3}{4}} = .87$$

$$\text{Strength of Association} = C/Cmax = \frac{.28}{.87} = .32$$

CHAPTER 10

CONCLUSIONS

The previous nine chapters of this study provided detailed descriptions of the archeology of the Upper St. Croix and Namekagon Rivers. The archeology of this area was relatively unknown prior to this study. Chapter 2 has provided a detailed summary of the environmental setting for the region. An understanding of the environmental variables present in the area is important in order to view the archeological resources from a cultural-ecological perspective. An understanding of the environment for the area is also important for it forms the basis for the stratification of the region into 18 environmental subregions. As indicated in Chapter 9, some environmental variables may have a stronger association with archeological sites located within the Riverway.

Chapter 3 provided a summary of the archeological knowledge of the region as it existed prior to the start of this project. Major archeological research has been undertaken in the greater northern Great Lakes area to which the results of this study must be viewed. It is important to note that the prehistoric resources located along the St. Croix River only represent settlements utilizing one optional environmental situation (riverine system) of a complex system

that likely exploited several additional broad environmental zones in a complex round of seasonal subsistence. The surrounding interior zones such as inland lakes, small tributaries and Great Lakes coastal zones were most likely occupied at varying degrees and times throughout the prehistory of the region. As explained in Chapter 7, the data from the riverway indicated that Archaic sites in the region probably reflects a northern adaptation based on the hunting of large mammals with the addition of seasonal fishing. It is likely that the Archaic sites located in the northern portions of the riverway may have been spring, summer, fall campsites involved with fishing activities on the river. It is also possible that the Archaic sites located in the southern portion of the study area have a seasonal subsistence activity with a heavier reliance on the collection of wild plant food associated with the maple-basswood forest that characterized the southern portion of the river.

The idea that at least during the late prehistoric period, winter camps within the northern Great Lakes would be located in interior areas along lakes and streams is based on a historic Chippewa settlement model (Fitting 1969, Fitting and Cleland 1969). However, no attempt has been made to apply this model to the Wisconsin and Minnesota portions of the Great Lakes. Lovis (1978) has indicated that this model may explain site distribution in the interior of the northern lower peninsula of Michigan. The prehistoric sites located

during this study are important in that they provide data relevant to the understanding of the settlement and subsistence models for the northern Great Lakes area. However, detailed subsistence analysis must wait until additional research is undertaken at the located sites.

A summary of the historic background for the riverway is provided in Chapter 4. This background is general in nature considering the wealth of historic information available for the region. The St. Croix Riverway Valley contains a wide spectrum of historic sites that include early fur trading posts, extensive logging era sites, post-logging farms, and early twentieth century recreational cabin sites. These sites are important for a full understanding of the social, economic and cultural histories of the area. Considering that a complete inventory of historic sites is known for a portion of the region, it is likely that a detailed archival search would provide data in order to compare the preliminary dates and functional interpretations made in this study. The majority of dates and functions given to specific sites are based in the most part on the recovered artifactual materials.

Chapter 5 described the survey methodology utilized for this study. The specific methodology described addresses both the theoretical and practical aspects of survey technology.

A narrative summary of the cultural material recovered from the 217 sites located is contained in Chapter 6. It has been the intent of the author to provide as much specific detail as possible to present a readily comparable data set for future research in the area. This is especially critical for historic materials. Previous researches in the area have long been biased against the majority of historic sites in favor of the more spectacular prehistoric sites. This is especially true of the late nineteenth century sites of which a majority in the area can be assigned to the logging era. These logging sites and post-logging farm sites are important for a full understanding of the area. Determining the scientific significance of individual historic sites in the riverway is made difficult by the fact that specific research questions are just beginning to be defined (Franzen 1979). In considering historic sites, Harris, Price and Price (1977) have predicted that "data from the last half of the nineteenth century will be considered more as archeologists incorporate problems in social and economic history and cultural geography into their research strategies".

With the advent of a national concern for the identification and protection of our cultural heritage, the necessity for viable sampling techniques has become apparent (Brose 1976, Lovis 1976, Mueller 1974). The original intent of this study was the location and evaluation of the archeo-

logical resources present and not sampling per se. Chapter 9 describes in detail the type of sampling that could be utilized successfully within the Riverway. It is suggested that a 20 percent random sample stratified according to vegetation would provide an accurate predictor of the total population for the riverway.

The above described study provides a basis from which additional specific problem-orientated research can be undertaken within the St. Croix Riverway.

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APPENDIX A

SUMMARY OF ARCHEOLOGICAL SITES-PHASE I

Site No.	State Site No.	Identity	Environmental Subregion
01-110-1		Dam ruins and logging camp	1
03-132-1		Logging dam ruin	2
04-133-1		Water mill with sluice and dam	2
04-133-2		Steam mill and log driving camp	2
04-150-1	47-BA-4	Prehistoric campsite	2
04-153-1		House and barn site	2
04-161-1		Lumber camp and log landing	2
04-167-1		House site	2
05-112-1		House outline and cellar depression	2
05-126-1		Structural depression	2
05-136-1		Chippewa village and cemetery	2
05-137-1		Pacwawong dam ruins	2
05-139-1		Two possible burial mounds	2
06-145-1		Doran's crossing and lumber camp	2
06-153-1		Dam embankment and house foundation	2
06-180-1		Dam remains	2
07-125-1		Prehistoric campsite	3
07-154-1		Logging dam	3

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE I

Site No.	State Site No.	Identity	Environmental Subregion
07-155-1		House site	3
11-119-1		Prehistoric habitation site	3
11-176-1		Railroad bridge ruins	3
12-130-1		Hayward mill	3
13-155-1		Dam ruins	3
13-179-1		Cadotte trading post	3
14-144-1		Cellar depression and dump	4
14-164-1		Stinnett logging camp and dam	3
16-149-1		Dump site	4
18-117-1		Prehistoric campsite	3
18-117-2		Veazie town site	3
18-117-3		Veazie dam	3
21-115-1		Prehistoric campsite	3
21-115-2		Prehistoric chipping site	3
21-135-1		Prehistoric habitation site	3
23-137-1		Prehistoric campsite	5
26-114-1		Moore's farm	2
28-101-1		Copper mine sluice dam	2
32-109-1	47-BT-49	Dogtown village	2
33-101-1		Logging camp	2

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE I

Site No.	State Site No.	Identity	Environmental Subregion
35-112-1		Pansy landing town site	2
35-124-1		Pansy landing ferry and bridge site	2
36-107-1		Three mounds	8
36-107-2	47-BT-48	Chippewa village	8
36-107-3		Four mounds	8
36-124-1		Historic Chippewa cemetery	8
37-120-1		Historic Chippewa cemetery and prehistoric to historic village	7
40-102-1		St. John's landing camp	9
40-104-1	21-PN-16	Little Yellow Banks	9
42-109-1		Norway logging camp, ferry landing, prehistoric campsite	11
43-103-1		Prehistoric campsite	10
45-101-1		Paint mine	10
45-102-1		Mill, dam, sluice	10
45-102-2		Stone stairway and wall	10
45-103-1		Pine City ferry landing	10
46-146-1		Prehistoric chipping station or habitation site	10

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE I

Site No.	State Site No.	Identity	Environmental Subregion
46-146-2		Mill site	10
48-103-1		Railroad bridge	15
48-109-1	47-BT-47	Indian cemetery	12
49-101-1		Possible mound	15
49-101-2		Cellar depressions	15
49-101-3		Cellar depressions	15
49-102-1	21-CH-15	Prehistoric habitation site	15
49-102-2		Dam and cribbing	15
49-151-1		Cellar and silo base	15
49-157-1		Rush City ferry landing	15
51-102-1	21-CH-21	Connor's Goose Creek trading post	15
52-102-1		S. W. Slack house	13
52-102-2		Sunrise to Nashua ferry landing	13
52-106-1		Prehistoric chipping station	12
53-101-1		Ola Nelson house site	13
54-101-1		Cellar depressions	12
54-101-2		House site	12
55-111-1		Nevers Dam	13
55-112-1		J. M. Pulliam house	13

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE I

Site No.	State Site No.	Identity	Environmental Subregion
55-112-2		Amador town site	13
56-103-1		G. Jerome house	13
56-116-1		Prehistoric campsite	16
58-108-1	47-PK-35	Chippewa-Sioux battle site	18

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE II

Site No.	State Site No.	Identity	Environmental Subregion
03-103-1		Prehistoric campsite	2
03-151-1		Historic mining area	2
03-158-1		Log cabin	2
03-156-1		Stone structure	2
03-159-1		Wing dams	2
03-164-1		Stone dam	2
03-182-1		Wing dams	2
03-183-1		Dam and dump	2
03-197-1		Cabin and mine	2
04-165-1		Structural depressions	2
04-165-2		Railroad grade	2
07-104-1		Prehistoric campsite	3
07-104-2		Historic Wing dam	3
13-126-1		Prehistoric campsite	3
13-138-1		Prehistoric campsite	3
13-141-1		Prehistoric campsite	3
14-110-1		Prehistoric campsite	3
14-110-2		Prehistoric campsite	3
15-102-1		Historic sheet dump	4
15-102-2		Historic sheet dump	4
15-140-1		Structural depression	4
16-122-1		Sheet dump	4

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE II

Site No.	State Site No.	Identity	Environmental Subregion
16-122-2		Log ramp	4
16-123-1		Sawmill remains	4
17-123-1		Lithic scatter	3
17-123-2		Structural depression	3
17-126-1		Prehistoric campsite	3
17-126-2		Lithic scatter	3
18-108-1		House foundation	3
18-108-2		Historic scatter prehistoric campsite	3
23-134-1		Structural depression	5
24-112-1		Structural depression	3
24-123-1		Rock alignment	2
25-107-1		Structural depression	5
27-105-1		Historic dump	2
30-115-1		Logging dam	2
31-107-1		Logging dam	2
33-108-1		Prehistoric campsite	2
33-132-1		Sluice dam	2
44-109-1		Historic find spot	10
45-147-1		Stone dam	9
46-141-1	21-PN-22	Prehistoric campsite	10
46-142-1		Cellar depression	10
48-108-1		Structural depression	12

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE II

Site No.	State Site No.	Identity	Environmental Subregion
48-108-2		Concrete & cobble foundation	12
48-109-2		Railroad right-of-way	14
48-115-2	21-CH-28	Structural depression	15
48-115-2		Prehistoric campsite	15
48-115-3		Sheet dump	15
49-157-2		Fieldstone foundation	14
49-159-1		Wing dam	14
50-108-1		Structural depression	14
51-102-2	21-CH-27	Prehistoric shell midden	15
51-102-3	21-CH-25	Prehistoric shell midden	15
51-102-4	21-CH-26	Prehistoric shell midden	15
51-102-5		Structural depression	15
52-102-3	21-CH-24	Prehistoric campsite	13
55-111-2		Stone cribbing	13
56-103-2	21-CH-23	Prehistoric scatter	13
56-112-1		Historic scatter	16

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE III

Site No.	State Site No.	Identity	Environmental Subregion
01-107-1		Stone Wing dam	1
02-105-1		Structural depressions	1
03-103-2		Stone Wing dams	2
03-103-3		Stone Wing dams	2
03-116-1		Stone Wing dams	2
04-111-1		Stone Wing dams	2
04-138-1		Log slide and dam	2
04-179-1		Stone Wing dams	2
04-179-2		Stone dam and wooden dam	2
04-180-1		Stone Wing dam	2
05-111-1		Structural depressions	2
05-135-1		Prehistoric village	2
05-147-1		Prehistoric campsite	2
05-149-1		Stone Wing dam	2
06-172-1		Stone piers and dams	2
07-123-1		Prehistoric campsite	3
07-154-2		Preshitoric lithic scatter	3
07-154-3		Road grade	3
08-152-1		Railroad bridge	3
08-159-1		Stone dams	3
10-115-1		Historic refuse dump	3
12-133-1		Structural depression	3

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE III

Site No.	State Site No.	Identity	Environmental Subregion
12-133-2		Historic refuse dump	3
12-133-3		Trench and embankment	3
13-169-1		Log slide	3
13-169-2		Prehistoric campsite	3
13-170-1		Historic refuge dump	3
14-114-1		Prehistoric campsite	3
15-150-1		Lithic scatter	4
23-110-1		Historic cellar depression	5
26-101-1		Structural depressions (logging camp?)	2
27-103-1		Stone Wing dam	2
27-104-1		Stone Wing dam	2
27-104-2		Bridge or dam remains	2
28-101-2		Logging Camp?	2
29-114-1		Stone Wing dam	2
29-119-1		Structural outline and depression	2
29-119-2		Stone Wing dam	2
30-116-1		Earthen dam	2
31-112-1		Earthen dam	2
32-109-2		Log dam	2
32-109-3		Structural depression	2
33-131-1		Stone dam	2

APPENDIX A (Continued)

SUMMARY OF ARCHEOLOGICAL SITES-PHASE III

Site No.	State Site No.	Identity	Environmental Subregion
40-105-1		Stone Wing dam	9
41-102-1		Log Pilings	11
41-109-1		Stone Wing dam	11
41-109-2		Stone Wing dam	11
42-109-2		Stone Wing dam	11
45-103-2		Sandstone quarry	10
45-149-1		Stone Wing dams	9
45-149-2		Stone Wing dam	9
45-149-3		Historic refuse and depressions	9
46-143-1		Logslide	10
47-129-1		Historic refuse, structural depression, and prehistoric campsite	13
47-129-2		Structural depressions and Wing dams (logging camp?)	13
47-129-3		Prehistoric campsite	13
47-129-4		Prehistoric campsite	13
47-129-5		Stone Wing dam	13
47-129-6		Stone Wing dam	13
47-129-7		Prehistoric campsite	13
47-129-8		Prehistoric campsite	13
47-129-9		Prehistoric and early historic campsite	13

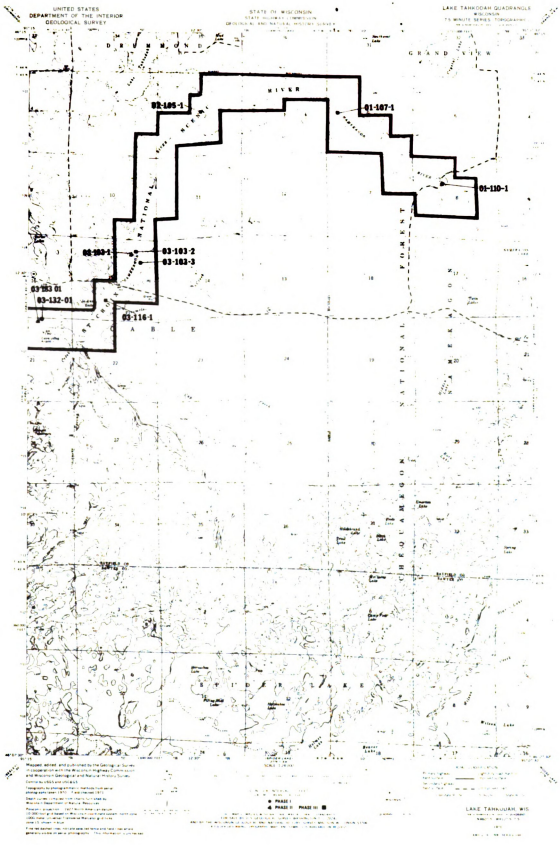
APPENDIX A (Continued)

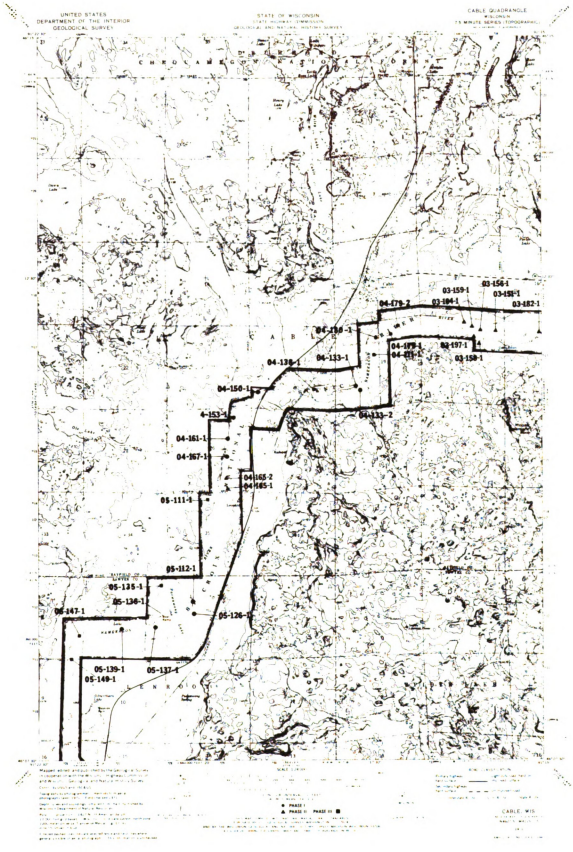
SUMMARY OF ARCHEOLOGICAL SITES-PHASE III

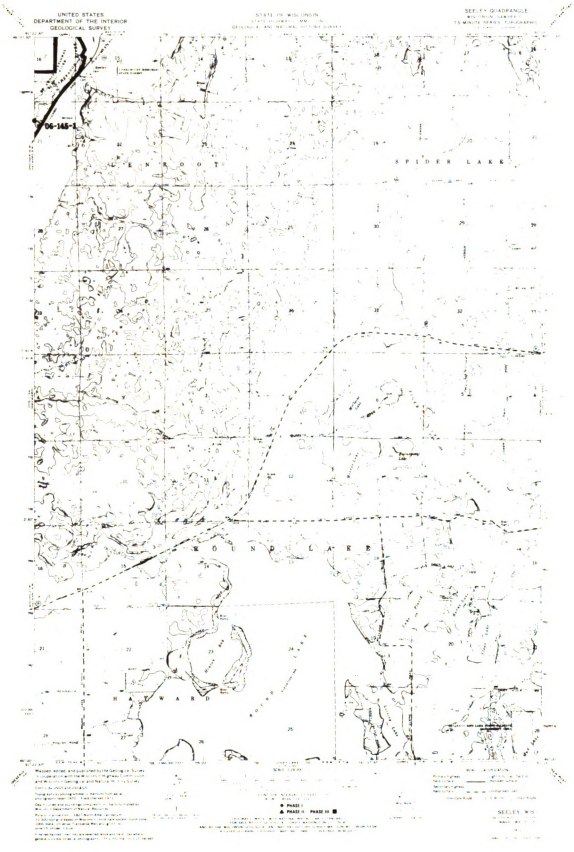
Site No.	State Site No.	Identity	Environmental Subregion
47-129-10		Historic refuse and structural remains	13
50-107-1		Concrete foundation	14
51-104-1		Prehistoric lithic scatter	14
51-104-2		Historic "still"	14
51-102-4		Prehistoric campsite	13
51-105-1		School site	12
53-104-1		Prehistoric campsite	12
53-107-1		Historic foundation	12
54-101-3		Foundation and cellar depression	12
54-102-1		Log dam or bridge remains	12
54-103-1		Prehistoric campsite	13
54-121-1		Prehistoric lithic scatter	13
55-104-1		Structural remains and refuse	16
56-119-1		Structural outlines	16
57-109-1		Structural outline	18
58-107-1		Prehistoric lithic scatter	17
58-108-2		Foundation and depression	18
58-122-1		Prehistoric campsite	18

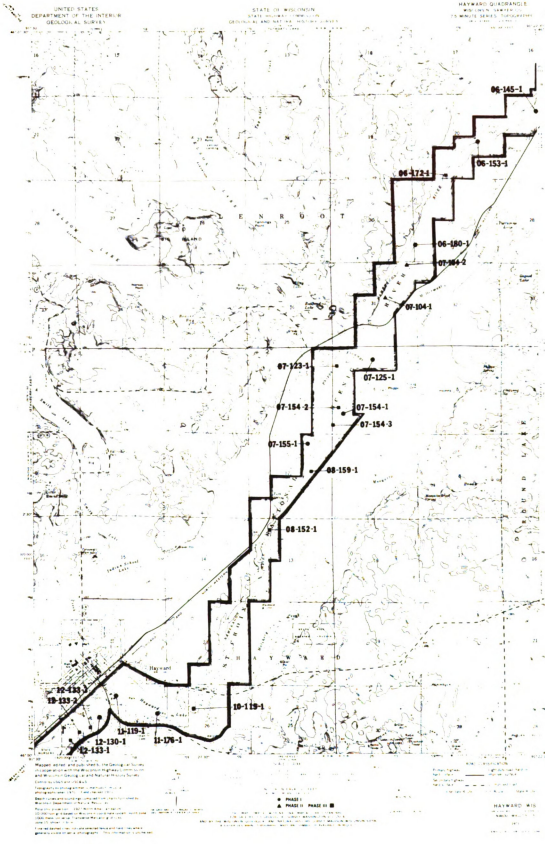
APPENDIX B

U.S.G.S. QUADRANGLE MAPS


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
LAKE TAHKODAH QUADRANGLE
WISCONSIN
7.5 MINUTE SERIES (TOPOGRAPHIC)
DRUMMOND
GRAND VIEW
RIVER
02-105-1
01-107-1
01-110-1
02-103-1
03-103-2
03-103-3
03-103-01
03-132-01
03-116-1
NATIONAL FOREST
CHEQUAMEGON
ABLE
LAKE TAHKUAMENON, MICH.

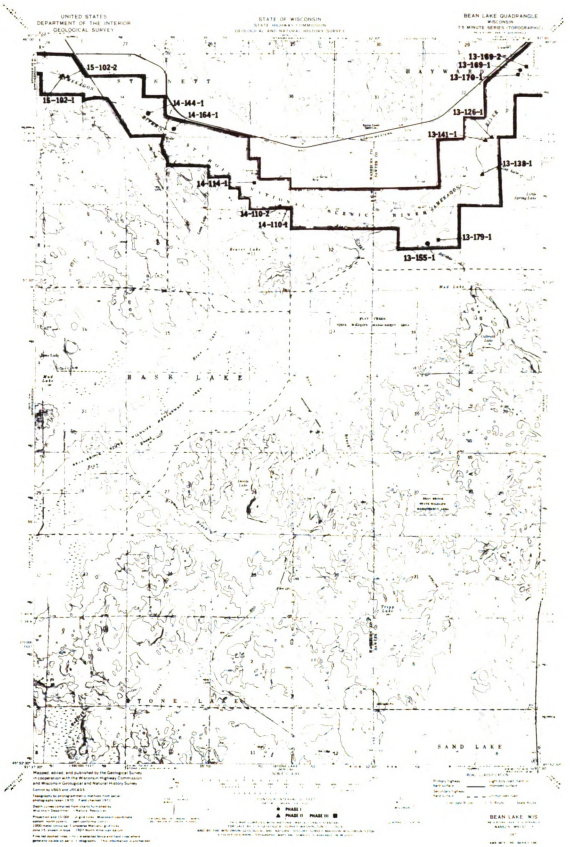

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
CABLE QUADRANGLE
03-156-1
03-159-1
03-158-1
03-184-1
03-182-1
04-178-2
04-156-1
04-133-1
04-179-1
04-197-1
04-177-1
03-150-1
04-138-1
04-150-1
04-153-1
04-133-2
04-161-1
04-367-1
04-165-2
04-165-1
05-111-1
05-112-1
05-135-1
05-136-1
05-147-1
05-126-1
05-139-1
05-149-1
05-137-1
CABLE, WIS.

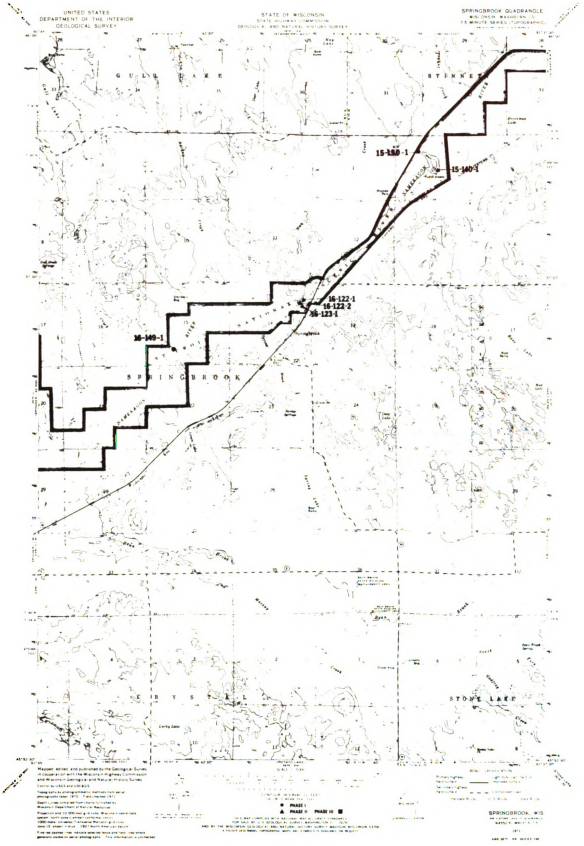

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
SEELEY QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)
T36-14E-1
SPIDER LAKE
MOUND LAKE
MARSH
SEELEY, WIS.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
HAYWARD QUADRANGLE
06-145-1
06-153-1
06-172-1
06-180-1
07-164-2
07-104-1
07-123-1
07-125-1
07-154-2
07-154-1
07-154-3
07-155-1
08-159-1
08-152-1
18-119-1
13-119-1
11-176-1
12-130-1
12-133-1
Hayward


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
RESERVE QUADRANGLE
HAYWARD
BASS LAKE
LAKE
LAC COURTE OREILLES
SAND LAKE
MURRAY
SCALE 1:24000
PHASE I
PHASE II
PHASE III
RESERVE, WIS.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
STANBERRY EAST QUADRANGLE
WISCONSIN
TOTAGATIC RIVER
STATE WILDLIFE MANAGEMENT AREA
FROG CREEK
ARNEY
ATKINSETT
BLAKEWOOD
PHASE I
PHASE II
PHASE III
STANBERRY EAST, WIS


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
BEAN LAKE QUADRANGLE
WISCONSIN
7.5 MINUTE SERIES (TOPOGRAPHIC)
15-102-2
15-102-1
14-144-1
14-164-1
14-134-1
14-110-2
14-110-1
13-189-2
13-189-1
13-170-1
13-126-1
13-141-1
13-138-1
13-179-1
13-155-1
BAYFIELD
BASS LAKE
SAND LAKE
SCENIC RIVERS
PHASE I
PHASE II
PHASE III
BEAN LAKE, WIS.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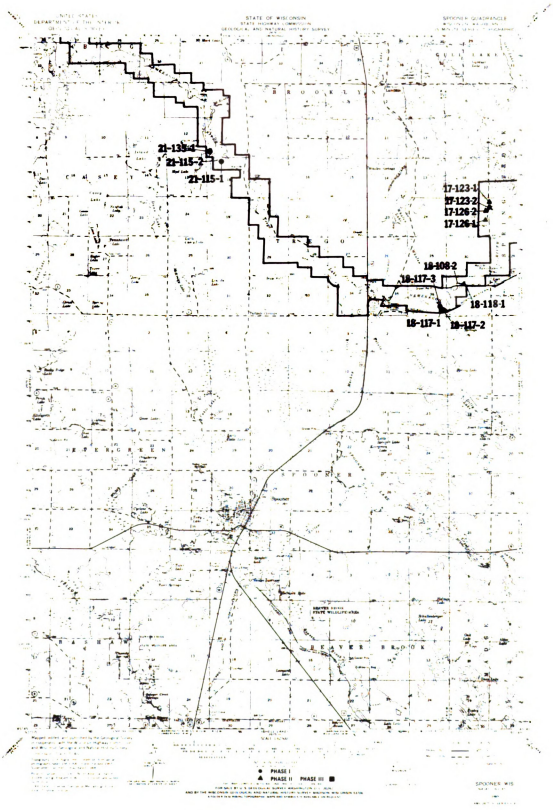
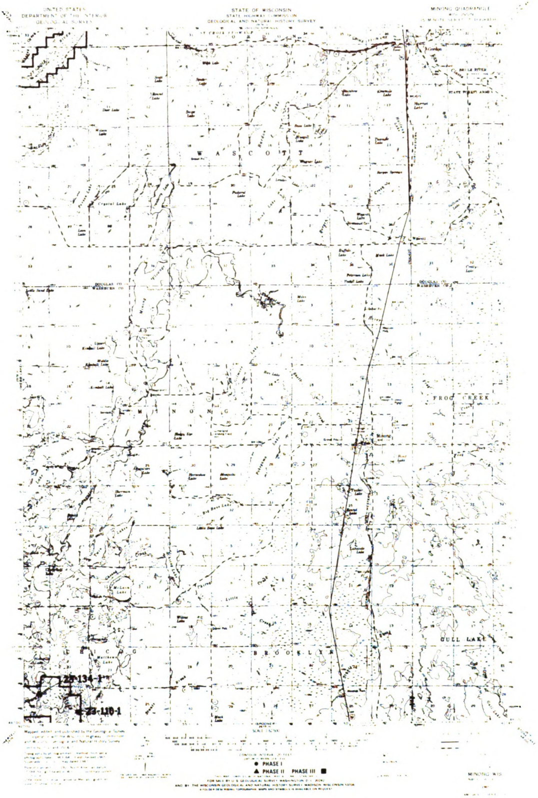
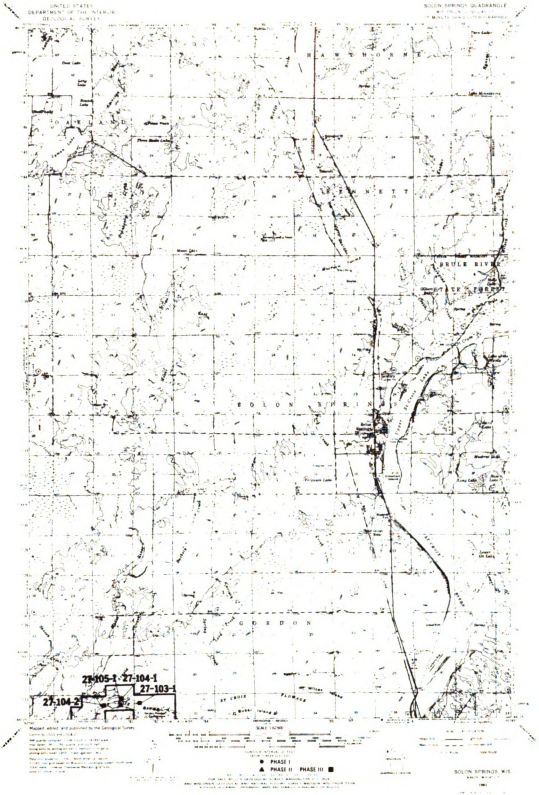
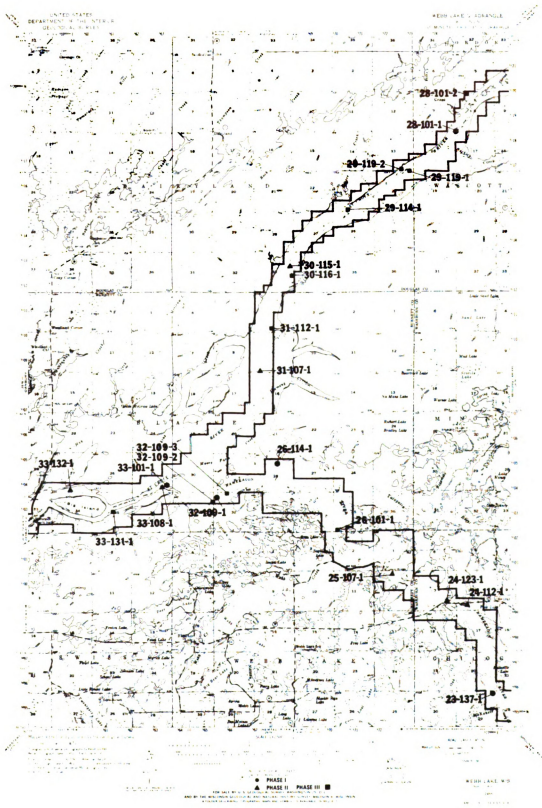
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
SPRINGBROOK QUADRANGLE
WISCONSIN
7.5 MINUTE SERIES (TOPOGRAPHIC)
GULL LAKE
STINKER
15-159-1
15-160-1
16-122-1
16-122-2
16-123-1
16-149-1
SPRINGBROOK
CRYSTAL
STONE LAKE
PHASE I
PHASE II
PHASE III
SPRINGBROOK, WIS


STATE OF WISCONSIN
21-135-4
21-115-2
21-115-1
17-123-1
17-123-2
17-126-2
17-126-1
18-109-2
18-117-3
18-118-1
18-117-1
18-117-2
PHASE II
PHASE III


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
STATE HIGHWAY COMMISSION
GEOLOGICAL AND NATURAL HISTORY SURVEY
MINONG QUADRANGLE
W A S C O T T
Crystal Lake
DOUGLAS CO
WASHBURN CO
M I N O N G
FROG CREEK
GULL LAKE
B R O O K L Y N
Gordon
BRULE RIVER
Little Bass Lake
23-134-1
23-110-1
PHASE I
PHASE II
PHASE III
FOR SALE BY U S GEOLOGICAL SURVEY WASHINGTON D C 20242
MINONG WIS


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
SOLON SPRINGS QUADRANGLE
WISCONSIN-MINNESOTA
7.5 MINUTE SERIES (TOPOGRAPHIC)
HAWTHORNE
BRULE RIVER
SOLON SPRINGS
GORDON
27-105-1
27-104-1
27-103-1
27-104-2
PHASE I
PHASE II
PHASE III
SOLON SPRINGS, WIS.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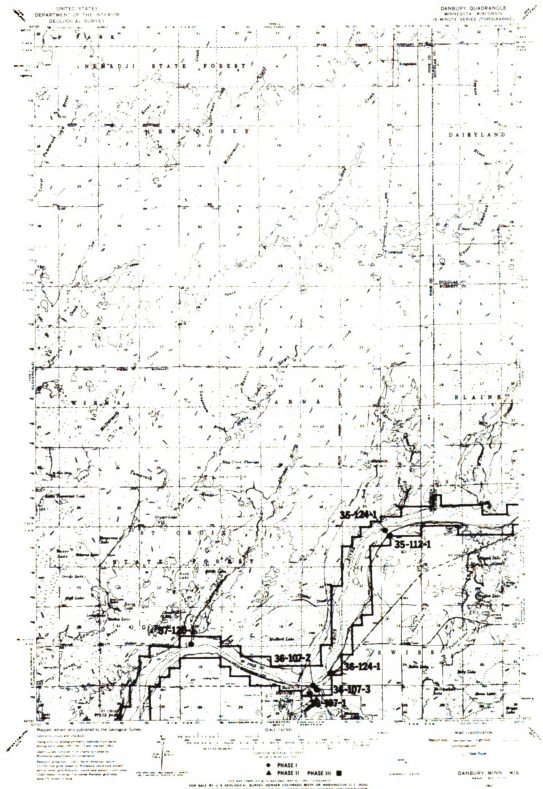
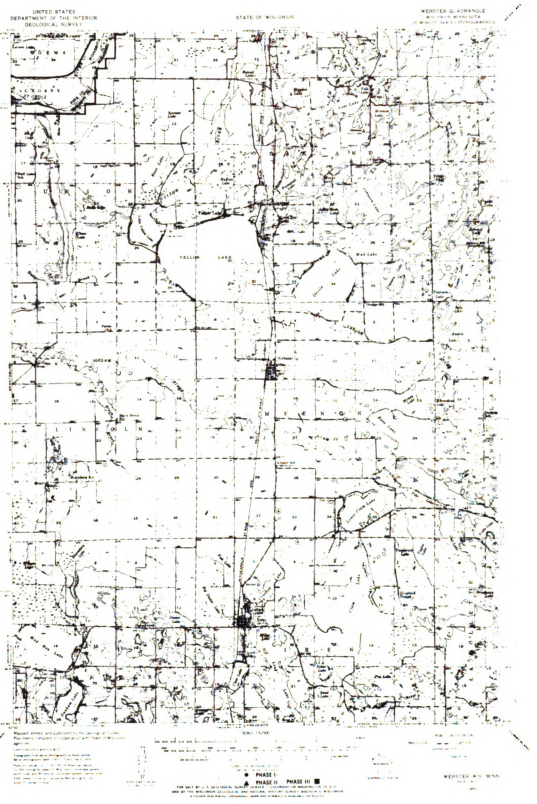
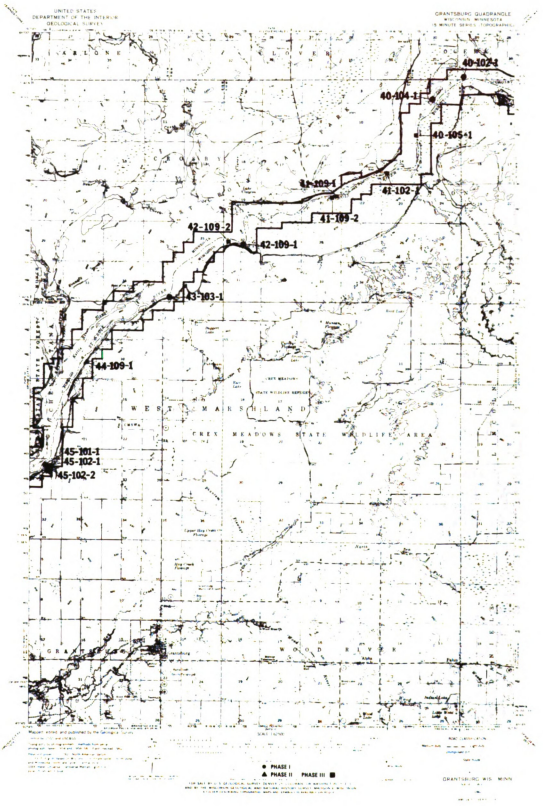
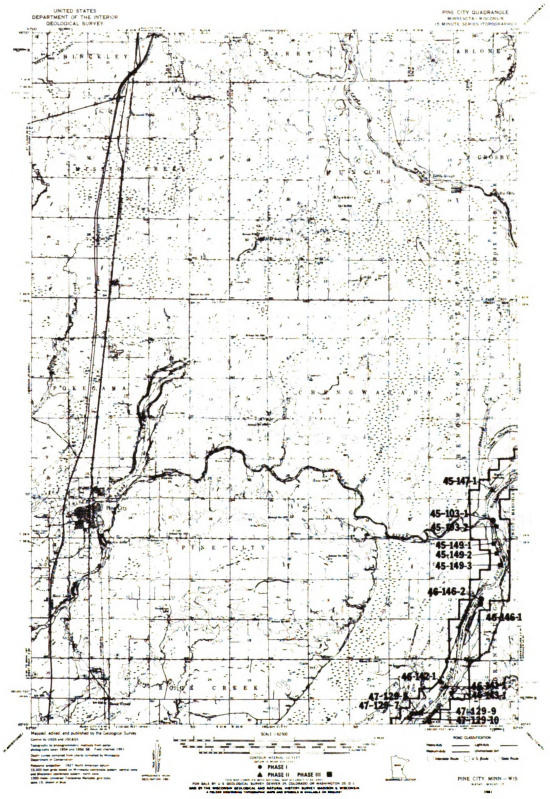
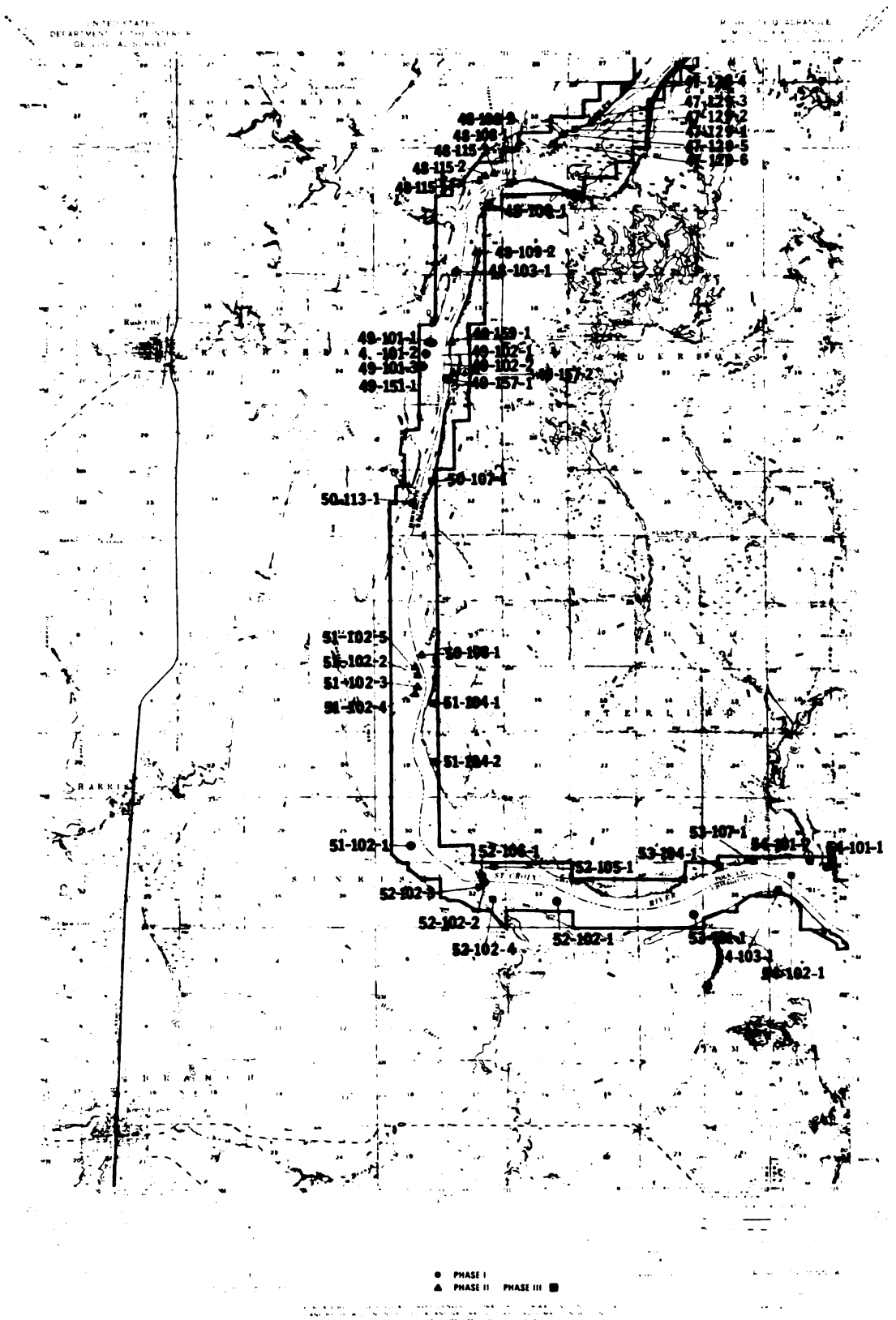
28-101-1
28-119-2
28-119-1
29-114-1
30-115-1
30-116-1
31-112-1
31-107-1
32-109-3
32-109-2
33-101-1
33-132-1
26-114-1
32-109-1
33-108-1
33-131-1
26-101-1
25-107-1
24-123-1
24-112-4
23-137-1
PHASE I
PHASE II
PHASE III


DANBURY QUADRANGLE
MINNESOTA-WISCONSIN
7.5 MINUTE SERIES (TOPOGRAPHIC)
NAMEKAGON STATE FOREST
DAIRYLAND
35-124-1
35-112-1
36-107-2
36-124-1
36-107-3
36-107-1
PHASE I
PHASE II PHASE III
DANBURY, MINN.-WIS.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
WEBSTER QUADRANGLE
MINNESOTA
7.5 MINUTE SERIES (TOPOGRAPHIC)
YELLOW LAKE
PHASE I
PHASE II
PHASE III
WEBSTER, WIS.-MINN.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
GRANTSBURG QUADRANGLE
WISCONSIN-MINNESOTA
7.5 MINUTE SERIES (TOPOGRAPHIC)
40-102-1
40-104-1
40-105-1
41-102-1
41-109-2
42-109-2
42-109-1
43-103-1
44-109-1
45-101-1
45-102-1
45-102-2
WEST MARSHLAND
CREX MEADOWS STATE WILDLIFE AREA
PHASE I
PHASE II
PHASE III
GRANTSBURG WIS.-MINN.


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
PINE CITY QUADRANGLE
MINNESOTA
7.5 MINUTE SERIES (TOPOGRAPHIC)
BROOK
ARLONE
CROSS
PINE CITY
45-147-1
45-103-1-C
45-103-2
45-149-1
45-149-2
45-149-3
46-146-2
46-146-1
46-142-1
47-129-A
47-129-7
47-129-9
47-129-10
PHASE I
PHASE II
PHASE III
SCALE 1:62500
PINE CITY, MINN.-WIS.


48-115-2
49-109-2
49-103-1
49-101-1
49-151-1
50-107-1
50-113-1
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51-102-3
51-102-4
51-104-1
51-104-2
51-102-1
52-106-1
52-105-1
52-102-3
52-102-2
52-102-4
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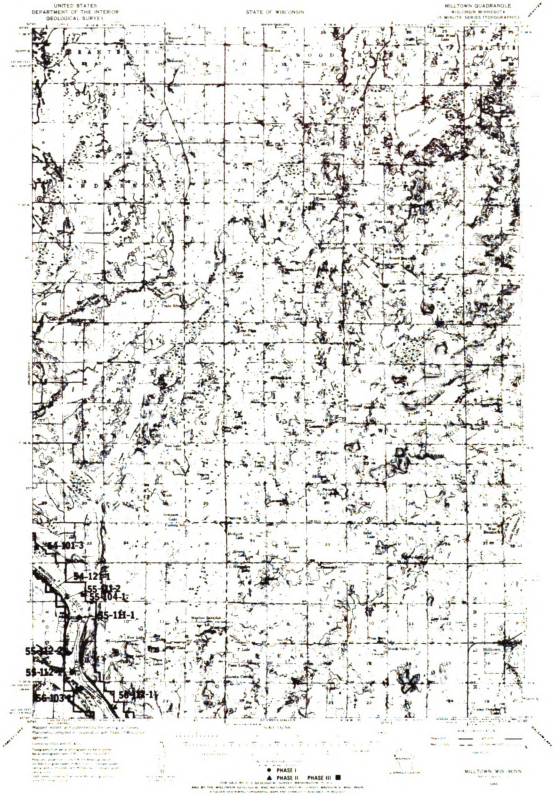
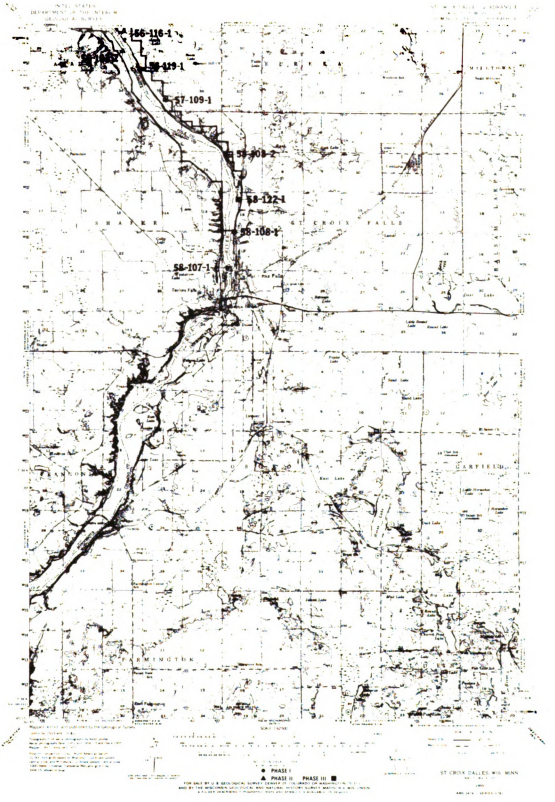
53-104-1
53-107-1
54-101-1
54-103-1
54-102-1
PHASE I
PHASE II
PHASE III


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
STATE OF WISCONSIN
MILLTOWN QUADRANGLE
WISCONSIN-MINNESOTA
15 MINUTE SERIES (TOPOGRAPHIC)
S4-10I-3
S4-12I-1
S5-10I-2
S5-10I-1
S5-11I-1
S5-11I-2
S5-12I-1
S5-12I-2
S5-10I-3
S5-10I-4
S5-11I-3
S5-12I-3
PHASE I
PHASE II
PHASE III
MILLTOWN, WIS.-MINN.


56-116-1
56-119-1
57-109-1
58-103-2
58-102-1
58-108-1
58-107-1
PHASE I
PHASE II
PHASE III

APPENDIX C

LITHIC MATERIAL

LITHIC MATERIAL DISTRIBUTION	PHASE I															
	05-136-1	07-125-1	11-119-1	18-117-1	21-115-1	21-115-2	21-135-1	23-137-1	36-107-2	36-107-3	42-109-1	43-103-1	46-146-1	52-106-1	56-116-1	TOTAL
FLINT																
Core	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1
Decortication flake	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	--	--	--	--	--	--	--	2	--	--	--	--	2	--	--	4
Flake of bifacial retouch	--	--	--	--	--	--	--	--	--	2	--	--	3	--	--	5
Retouched flake	--	--	--	1	--	--	--	--	1	--	--	--	--	1	--	3
Scraper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Projectile point	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1
Gunflint	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	2
QUARTZITE																
Decortication flake	--	1	--	--	1	1	--	1	3	2	--	--	--	--	--	9
Blocky flake	--	--	--	--	1	--	2	--	--	2	--	--	13	1	--	19
Flat flake	--	2	--	3	1	5	--	--	4	6	5	3	10	--	--	39
Flake of bifacial retouch	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1
Retouched flake	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Projectile point	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1
Graver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Biface	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1

APPENDIX C (cont'd)

PHASE I

LITHIC MATERIAL DISTRIBUTION	05-136-1	07-125-1	11-119-1	18-117-1	21-115-1	21-115-2	21-135-1	23-137-1	36-107-2	36-107-3	42-109-1	43-103-1	46-146-1	52-106-1	56-116-1	TOTAL
QUARTZ																
Decortication flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flake of bifacial retouch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Projectile point	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Biface	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Biface fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BASALT																
Decortication flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Scraper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Knive	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FELSITE																
Flat flake	--	--	1	--	--	--	--	--	--	--	--	--	2	--	1	4
Biface	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1

APPENDIX C (cont'd)

LITHIC MATERIAL DISTRIBUTION	PHASE I															
	05-136-1	07-125-1	11-119-1	18-117-1	21-115-1	21-115-2	21-135-1	23-137-1	36-107-2	36-107-3	42-109-1	43-103-1	46-146-1	52-106-1	56-116-1	TOTAL
OTHER																
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Knife	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	1	5	2	5	4	6	3	3	9	13	5	3	32	3	1	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	95

APPENDIX C (cont'd)

PHASE II

LITHIC MATERIAL DISTRIBUTION	03-103-1	07-104-1	13-126-1	13-141-1	13-138-1	14-110-1	14-110-2	17-123-1	17-126-1	17-126-2	18-108-2	33-108-1	46-141-1	48-115-1	51-102-2	51-102-3	52-102-3	56-103-3	TOTAL
FLINT																			
Core	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decortication flake	--	2	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	3
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	--	1	--	1	--	1	--	--	1	--	--	--	2	--	--	--	--	--	6
Flake of bifacial retouch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Scraper	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Projectile point	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gunflint	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
QUARTZITE																			
Decortication flake	1	--	4	5	--	--	--	2	--	--	1	--	--	--	--	1	--	--	14
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	--	--	3	--	3	--	--	1	--	--	--	--	--	--	--	1	5	2	15
Flake of bifacial retouch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Projectile point	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Graver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Biface	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX C (cont'd)

PHASE II

LITHIC MATERIAL DISTRIBUTION	03-103-1	07-104-1	13-126-1	13-141-1	13-138-1	14-110-1	14-110-2	17-123-1	17-126-1	17-126-2	18-108-2	33-108-1	46-141-1	48-115-1	51-102-2	51-102-3	52-102-3	56-103-3	TOTAL
QUARTZ																			
Decortication flake	1	--	--	6	--	1	--	--	--	1	1	6	--	2	--	2	--	--	20
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	4	1	4	--	--	--	2	--	5	--	--	5	4	2	7	--	--	--	34
Flake of bifacial retouch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1
Projectile point	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Biface	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1
Biface fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BASALT																			
Decortication flake	--	--	--	--	--	2	--	1	--	--	--	--	2	2	1	--	--	--	8
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1
Flat flake	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1	--	--	2
Scraper	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Knife	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
FELSITE																			
Flat flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Biface	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX C (cont'd)

LITHIC MATERIAL DISTRIBUTION	PHASE II																		
	03-103-1	07-104-1	13-126-1	13-141-1	13-138-1	14-110-1	14-110-2	17-123-1	17-126-1	17-126-2	18-108-2	33-108-1	46-141-1	48-115-1	51-102-2	51-102-3	52-102-3	56-103-3	TOTAL
OTHER																			
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flat flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Knife	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	7	4	13	12	3	4	3	4	7	2	2	12	8	6	8	5	6	2	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	108

APPENDIX C (cont'd)

LITHIC MATERIAL DISTRIBUTION	PHASE III																								
	05-147-1	07-123-1	07-154-2	13-169-2	14-114-1	15-150-1	46-145-1	47-129-IF1	47-129-IF2	47-129-1	47-129-3	47-129-4	47-129-7	47-129-8	47-129-9	51-104-1	52-102-3	53-104-1	54-101-2	54-103-1	54-121-1	58-107-1	58-122-1	TOTAL	GRAND TOTAL
FLINT																									
Core	--	--	--	--	--	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	1	--	--	3	4
Decortication flake	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	7
Blocky flake	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	1	--	--	--	--	--	--	--	3	3
Flat flake	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	1	--	--	3	13
Flake of bi-facial retouch	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	6
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	4
Scraper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	2
Projectile point	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Gunflint	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
QUARTZITE																									
Decortication flake	1	--	--	--	1	1	--	--	--	--	--	1	--	--	4	--	1	--	--	--	--	--	--	9	32
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1	20
Flat flake	5	--	--	1	1	--	1	1	--	--	--	1	--	--	2	--	--	--	--	1	--	--	2	15	69

APPENDIX C (cont'd)

LITHIC MATERIAL DISTRIBUTION	PHASE III																								
	05-147-1	07-123-1	07-154-2	13-169-2	14-114-1	15-150-1	46-145-1	47-129-IF1	47-129-IF2	47-129-1	47-129-3	47-129-4	47-129-7	47-129-8	47-129-9	51-104-1	52-102-3	53-104-1	54-101-2	54-103-1	54-121-1	58-107-1	58-122-1	TOTAL	GRAND TOTAL
Flake of bi-facial retouch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	2
Projectile point	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	--	2	3
Graver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1
Biface	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
QUARTZ																									
Decortication flake	--	1	--	--	3	3	--	--	--	--	9	--	1	5	1	--	4	2	--	--	--	--	--	29	49
Blocky flake	--	--	--	--	1	--	--	--	--	--	--	--	11	4	--	--	4	--	1	--	--	--	2	23	23
Flat flake	--	3	--	--	3	1	--	--	--	--	--	--	--	2	2	--	2	4	1	--	1	1	1	21	55
Flake of bi-facial retouch	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	2	2
Retouched flake	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	3
Projectile point	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1	2	2

APPENDIX C (cont'd)

PHASE III

LITHIC MATERIAL DISTRIBUTION	05-147-1	07-123-1	07-154-2	13-169-2	14-114-1	15-150-1	46-145-1	47-129-IF1	47-129-IF2	47-129-1	47-129-3	47-129-4	47-129-7	47-129-8	47-129-9	51-104-1	52-102-3	53-104-1	54-101-2	54-103-1	54-121-1	58-107-1	58-122-1	TOTAL	GRAND TOTAL
Biface	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Biface fragment	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	3	3
BASALT																									
Decortication flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8
Blocky flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Flat flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
Scraper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Knife	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
FELSITE																									
Flat flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
Biface	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
OTHER																									
Blocky flake	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	2	2
Flat flake	3	--	2	--	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--	1	--	--	--	11	11
Retouched flake	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	1
Knife	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1	--	--	--	--	2	2

APPENDIX C (cont'd)

PHASE III

LITHIC MATERIAL DISTRIBUTION	05-147-1	07-123-1	07-154-2	13-169-2	14-114-1	15-150-1	46-145-1	47-129-IF1	47-129-IF2	47-129-1	47-129-3	47-129-4	47-129-7	47-129-8	47-129-9	51-104-1	52-102-3	53-104-1	54-101-2	54-103-1	54-121-1	58-107-1	58-122-1	TOTAL	GRAND TOTAL
TOTAL	10	5	2	1	13	5	2	1	1	1	16	6	15	12	9	1	15	7	3	4	3	2	8	--	142
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	345

APPENDIX D

EARTHENWARE DISTRIBUTION

	PHASE I															
	1-110-1	4-153-1	6-145-1	14-144-1	26-114-1	32-109-1	33-101-1	36-107-2	36-107-3	42-109-1	49-101-1	52-102-1	54-101-2	55-112-1	56-103-1	TOTAL
WHITE BISQUIT																
SOFT PASTE																
White glaze	2	6	2	--	6	--	--	--	--	--	--	--	--	--	--	16
Cream glaze	--	3	--	--	--	--	--	--	--	--	--	--	3	--	--	6
Pearl glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2
Buff glaze	--	--	--	--	5	--	--	--	--	--	--	--	--	--	--	5
Pink glaze	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	2
Brown glaze	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	3
Yellow glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Brown transfer print	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	3
Red transfer print	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1
Decalcomania	4	--	--	--	3	--	--	1	--	--	--	--	--	--	--	8
Blue flow	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1
Pink floral	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	2
Gold lined	3	5	--	--	--	--	--	--	2	--	--	--	--	--	--	10
Brown lined	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	2
Banded	--	--	--	--	--	--	--	--	--	--	--	--	7	--	--	7
Blue line	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Burned	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX D (cont'd)

	PHASE I															
	1-110-1	4-153-1	6-145-1	14-144-1	26-114-1	32-109-1	33-101-1	36-107-2	36-107-3	42-109-1	49-101-1	52-102-1	54-101-2	55-112-1	56-103-1	TOTAL
SEMIVITREOUS PASTE																
White glaze	--	--	--	--	--	--	--	--	--	--	3	--	--	2	--	5
Pearl glaze	--	--	1	--	11	--	--	--	--	--	--	14	--	9	--	35
Blue glaze	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1
Blue flow transfer print	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	1
Blue transfer print	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Green transfer print	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VITREOUS PASTE																
White glaze	--	--	--	--	--	1	--	1	--	--	--	--	--	--	--	2
Blue transfer print	--	--	--	5	--	--	--	--	--	--	--	--	--	--	--	5
Salt glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Painted	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decalcomania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
COLORED BISQUIT																
SOFT PASTE																
Unglazed	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	2
SEMIVITREOUS PASTE																
Salt glaze	--	--	--	--	4	--	--	--	--	--	--	--	--	--	--	4
Brown glaze	--	--	2	--	4	2	--	--	--	--	--	--	--	1	--	9
White glaze	--	--	--	--	2	2	--	--	--	1	--	--	--	1	--	6

APPENDIX D (cont'd)

	PHASE I															
	1-110-1	4-153-1	6-145-1	14-144-1	26-114-1	32-109-1	33-101-1	36-107-2	36-107-3	42-109-1	49-101-1	52-102-1	54-101-2	55-112-1	56-103-1	TOTAL
VITREOUS PASTE																
Salt glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
White glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Brown glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unglazed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OTHER																
Kaolin pipe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Clay marble	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
China doll	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	9	14	10	5	40	5	1	3	2	2	3	16	10	14	2	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	136

APPENDIX D (cont'd)

	PHASE II											
	03-183-1	04-165-1	15-102-1	16-122-1	18-108-1	25-107-1	44-109-1	46-124-1	48-115-1	52-102-4	56-112-1	TOTAL
WHITE BISQUIT												
SOFT PASTE												
White glaze	--	--	--	3	--	--	--	--	1	--	3	7
Cream glaze	--	1	--	--	--	--	--	--	--	--	--	1
Pearl glaze	--	--	--	--	--	--	--	--	--	--	2	2
Buff glaze	--	--	--	--	--	--	--	--	--	--	--	--
Pink glaze	--	--	--	--	--	--	--	--	--	--	--	--
Brown glaze	--	--	--	--	--	--	--	--	--	--	--	--
Yellow glaze	--	--	--	--	--	--	--	--	--	--	--	--
Brown transfer print	--	--	--	--	--	--	--	--	--	--	--	--
Red transfer print	--	--	--	--	--	--	--	--	--	--	--	--
Decalcomania	--	--	--	1	--	--	--	--	--	--	--	1
Blue flow	--	--	--	--	--	--	--	--	--	--	--	--
Pink floral	--	--	--	--	--	--	--	--	--	--	--	--
Gold lined	--	--	--	--	--	--	--	--	--	--	--	--
Brown lined	--	--	--	--	--	--	--	--	--	--	--	--
Banded	--	--	--	--	--	--	--	--	--	--	--	--
Blue line	--	--	--	--	3	--	--	--	--	--	--	3
Burned	--	--	--	--	5	--	--	--	--	--	--	5
SEMIVITREOUS PASTE												
White glaze	--	--	--	--	--	--	--	--	--	--	--	--
Pearl glaze	--	--	--	--	--	--	--	--	--	--	--	--
Blue glaze	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX D (cont'd)

	PHASE II											
	03-183-1	04-165-1	15-102-1	16-122-1	18-108-1	25-107-1	44-109-1	46-124-1	48-115-1	52-102-4	56-112-1	TOTAL
Blue flow transfer print	--	--	--	--	--	--	--	--	--	--	--	--
Blue transfer print	--	--	--	--	--	--	--	--	--	--	--	--
Green transfer print	--	--	--	--	--	--	--	--	--	--	--	--
VITREOUS PASTE												
White glaze	--	--	--	--	2	--	--	--	1	--	--	3
Blue transfer print	--	--	--	--	--	--	--	--	--	--	--	--
Salt glaze	--	--	--	--	--	--	--	--	--	--	--	--
Painted	--	--	2	--	--	--	--	--	--	--	--	2
Decalcomania	--	--	--	2	--	--	--	--	--	--	--	2
COLORED BISQUIT												
SOFT PASTE												
Unglazed	--	--	--	--	--	--	--	--	--	--	--	--
SEMIVITREOUS PASTE												
Salt glaze	--	--	--	--	--	--	--	--	--	--	--	--
Brown glaze	--	--	--	--	--	--	--	--	--	--	--	--
White glaze	--	--	--	--	--	--	--	--	--	--	--	--
VITREOUS PASTE												
Salt glaze	1	--	--	--	--	--	--	--	--	1	--	2
White glaze	--	3	3	1	--	1	3	2	7	--	4	24

APPENDIX D (cont'd)

	PHASE II											
	03-183-1	04-165-1	15-102-1	16-122-1	18-108-1	25-107-1	44-109-1	46-124-1	48-115-1	52-102-4	56-112-1	TOTAL
Brown glaze	--	--	--	--	--	--	--	--	--	--	1	1
Unglazed	--	--	--	--	--	--	--	--	1	--	--	1
OTHER												
Kaolin pipe	--	--	--	--	--	--	--	--	--	--	--	--
Clay marble	--	--	--	--	--	--	--	--	--	--	--	--
China doll	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	1	4	5	7	10	1	3	2	10	1	10	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	54

APPENDIX D (cont'd)

	PHASE III																	
	06-180-1	10-115-1	12-133-2	13-170-1	28-101-2	29-119-1	32-109-2	32-109-3	47-129-1	47-129-9	47-129-10	51-104-2	53-107-1	54-101-3	54-104-1	56-119-1	TOTAL	GRAND TOTAL
WHITE BISQUIT																		
SOFT PASTE																		
White glaze	8	--	--	1	39	--	5	--	--	--	--	2	--	2	--	--	57	80
Cream glaze	2	2	--	--	--	1	--	--	--	--	7	--	--	--	--	--	12	19
Pearl glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
Buff glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5
Pink glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Brown glaze	1	--	--	--	--	--	1	--	--	--	1	--	1	--	2	--	6	9
Yellow glaze	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Brown transfer print	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Red transfer print	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Decalcomania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9
Blue flow	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Pink floral	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Gold lined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10
Brown lined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Banded	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	3	10
Blue line	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Burned	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5
SEMIVITREOUS PASTE																		
White glaze	--	2	1	2	--	--	1	--	3	1	14	--	4	1	--	3	32	37

APPENDIX D (cont'd)

	PHASE III																	
	06-180-1	10-115-1	12-133-2	13-170-1	28-101-2	29-119-1	32-109-2	32-109-3	47-129-1	47-129-9	47-129-10	51-104-2	53-107-1	54-101-3	54-104-1	56-119-1	TOTAL	GRAND TOTAL
Pearl glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	35
Blue glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Blue flow transfer print	--	--	--	1	--	--	--	--	--	--	1	--	2	--	--	--	4	5
Blue transfer print	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2
Green transfer print	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	2	2
VITREOUS PASTE																		
White glaze	3	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	4	9
Blue transfer print	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		5
Salt glaze	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	1
Painted	--	--	--	1	--	--	--	--	--	--	1	--	--	--	--	--	2	4
Decalcomania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	23
COLORED BISQUIT																		
SOFT PASTE																		
Unglazed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
SEMIVITREOUS PASTE																		
Salt glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4

APPENDIX D (cont'd)

	PHASE III																	
	06-180-1	10-115-1	12-133-2	13-170-1	28-101-2	29-119-1	32-109-2	32-109-3	47-129-1	47-129-9	47-129-10	51-104-2	53-107-1	54-101-3	54-104-1	56-119-1	TOTAL	GRAND TOTAL
Brown glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9
White glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6
VITREOUS PASTE																		
Salt glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
White glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24
Brown glaze	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Unglazed	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
OTHER																		
Kaolin pipe	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	1	1
Clay marble	--	--	--	--	--	--	--	4	--	--	--	--	1	--	--	--	5	5
China doll	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	1
TOTAL	14	4	4	6	39	2	7	4	4	1	27	2	11	3	2	3	133	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	323

APPENDIX E

METAL DISTRIBUTION

	PHASE I												
	1-110-1	4-153-1	5-136-1	6-145-1	18-117-2	26-114-1	32-109-1	35-112-1	36-107-2	52-102-1	54-101-1	55-112-1	TOTAL
BRASS													
Buckle fragment	--	--	--	--	--	--	--	--	--	1	--	--	1
Harmonica reed board	--	--	--	--	--	--	1	--	--	--	--	--	1
22 caliber bullet	--	--	--	--	--	--	--	--	--	--	--	--	--
Electric terminal	--	--	--	--	--	--	--	--	--	--	--	--	--
IRON AND STEEL													
NAILS													
Horseshoe	--	1	--	--	--	--	--	--	--	--	--	--	1
Square cut	--	--	1	3	7	--	--	--	--	6	--	--	17
Wire	--	--	--	--	--	3	1	--	--	--	1	--	5
SPIKES													
BOLTS													
Machine	--	--	--	--	--	--	--	--	--	--	--	--	--
Fragment	--	--	--	1	--	--	--	--	--	--	--	--	1
Washer	--	--	--	--	--	--	--	--	--	--	--	--	--
OTHER													
Axehead	--	--	--	1	--	1	--	--	--	--	--	--	2
Barrel loop	--	--	--	--	3	--	1	--	--	--	--	--	4

APPENDIX E (cont'd)

PHASE I

	1-110-1	4-153-1	5-136-1	6-145-1	18-117-2	26-114-1	32-109-1	35-112-1	36-107-2	52-102-1	54-101-1	55-112-1	TOTAL
Button front	--	--	--	--	--	--	1	--	--	--	--	--	1
Chain	--	--	--	--	--	1	--	--	--	--	--	--	1
File fragment	--	--	--	--	--	--	1	--	--	--	--	--	1
Handle	--	--	--	--	--	1	--	--	--	--	--	--	1
Hinge	--	--	--	1	--	1	--	--	--	--	--	--	2
Hook	--	--	--	1	--	1	--	--	--	--	--	--	2
Horseshoe	5	--	--	--	--	1	--	--	--	--	--	--	6
Kerosene lamp Wick holder	--	--	--	1	--	--	--	--	--	--	--	--	1
Pintle	--	--	--	1	--	--	--	--	--	--	--	--	1
Shovel blade	--	--	--	--	--	--	1	--	--	--	--	--	1
Spoon	2	--	--	--	--	--	--	--	--	--	--	--	2
Knife	--	--	--	--	--	--	--	--	--	--	--	--	--
Stove fragment	--	--	--	2	--	--	--	3	--	--	--	--	5
Tin can	--	1	--	--	--	--	--	--	--	--	2	--	3
Tinware	--	--	--	--	--	--	--	--	--	--	--	--	--
Enameled ware	--	--	--	--	--	--	--	--	--	--	--	--	--
License	--	--	--	--	--	--	--	--	--	--	--	--	--
Crosscut saw	--	--	--	--	--	--	--	--	--	--	--	--	--
Door latch	--	--	--	--	--	--	--	--	--	--	--	--	--
Indianhead penny	--	--	--	--	--	--	--	--	--	--	--	--	--
Container lid	--	--	--	--	--	--	--	--	--	--	--	--	--
Sickle blades	--	--	--	--	--	--	--	--	--	--	--	--	--
D ring	--	--	--	--	--	--	--	--	--	--	--	--	--
Strike-a-lite	--	--	--	--	--	--	--	--	--	--	--	--	--
Ornamental horse	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX E (cont'd)

	PHASE I												
	1-110-1	4-153-1	5-136-1	6-145-1	18-117-2	26-114-1	32-109-1	35-112-1	36-107-2	52-102-1	54-101-1	55-112-1	TOTAL
UNIDENTIFIED													
Amorphous	--	--	--	--	--	3	--	--	1	8	--	1	13
TOTAL	8	2	1	11	10	12	6	3	1	15	3	1	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	73

APPENDIX E (cont'd)

PHASE II

	03-151-1	03-183-1	04-165-1	15-102-2	15-140-1	16-123-1	17-123-2	18-108-1	18-108-2	23-134-1	48-108-1	48-115-3	52-102-4	TOTAL
BRASS														
Buckle fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Harmonica reed board	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22 caliber bullet	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electric terminal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IRON AND STEEL														
NAILS														
Horseshoe	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Square cut	--	--	--	--	2	--	1	--	--	--	--	--	4	7
Wire	--	1	2	--	--	4	--	3	--	2	--	1	--	13
SPIKES														
BOLTS														
Machine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Washer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OTHER														
Axehead	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barrel loop	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Button front	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chain	--	--	--	--	--	--	--	--	--	--	--	--	--	--
File fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX E (cont'd)

	PHASE II													
	03-151-1	03-183-1	04-165-1	15-102-2	15-140-1	16-123-1	17-123-2	18-108-1	18-108-2	23-134-1	48-108-1	48-115-3	52-102-4	TOTAL
Handle	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hinge	--	--	--	--	1	--	--	--	--	1	--	--	--	2
Hook	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Horseshoe	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Kerosene lamp wick holder	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pintle	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Shovel blade	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Spoon	--	--	--	--	--	--	--	1	--	--	1	--	--	2
Knife	--	1	--	--	--	--	--	--	--	--	--	--	--	1
Stove fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin can	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tinware	1	--	1	1	--	--	1	--	--	--	--	1	--	5
Enameled ware	--	--	1	--	--	--	--	--	1	--	--	--	--	2
License	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Crosscut saw	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Door latch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indianhead penny	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Container lid	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sickle blades	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D ring	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strike-a-lite	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ornamental horse	--	--	--	--	--	--	--	--	--	--	--	--	--	--

APPENDIX E (cont'd)

	PHASE II													
	03-151-1	03-183-1	04-165-1	15-102-2	15-140-1	16-123-1	17-123-2	18-108-1	18-108-2	23-134-1	48-108-1	48-115-3	52-102-4	TOTAL
UNIDENTIFIED														
Amorphous	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL	1	2	4	1	3	4	2	4	1	3	1	3	4	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	33

APPENDIX E (cont'd)

	PHASE III															
	06-180-1	12-133-3	27-104-1	28-101-2	29-119-1	45-149-3	47-129-1	47-129-9	47-129-10	53-107-1	54-101-3	54-104-1	55-111-1	56-119-1	TOTAL	GRAND TOTAL
BRASS																
Buckle fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Harmonica reed board	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
22 caliber bullet	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Electric terminal	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	1
IRON AND STEEL																
NAILS																
Horseshoe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Square cut	--	2	--	--	--	--	1	--	--	--	12	1	--	--	16	40
Wire	--	--	--	--	--	2	--	--	3	--	--	2	--	1	8	26
SPIKES	--	--	1	--	--	--	--	--	--	--	--	--	12	--	13	15
BOLTS																
Machine	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	1
Fragment	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	2
Washer	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1	1
OTHER																
Axehead	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Barrel loop	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	5
Button front	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Chain	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1

APPENDIX E (cont'd)

	PHASE III															
	06-180-1	12-133-3	27-104-1	28-101-2	29-119-1	45-149-3	47-129-1	47-129-9	47-129-10	53-107-1	54-101-3	54-104-1	55-111-1	56-119-1	TOTAL	GRAND TOTAL
File fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Handle	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Hinge	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
Hook	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Horseshoe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6
Kerosene lamp wick holder	--	--	--	--	--	1	--	--	--	--	--	--	--	--	1	2
Pintle	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Shovel blade	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Spoon	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
Knife	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Stove fragment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5
Tin can	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
Tinware	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5
Enameled ware	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
License	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Crosscut saw	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Door latch	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Indianhead penny	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	1
Container lid	--	--	--	--	--	2	--	--	--	--	--	--	--	--	2	2
Sickle blades	--	--	--	--	--	--	--	--	2	--	--	--	--	--	2	2
D ring	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1	1
Strike-a-lite	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1	1
Ornamental horse	--	--	--	--	--	--	--	--	--	1	--	--	--	--	1	1

APPENDIX E (cont'd)

	PHASE III															
	06-180-1	12-133-3	27-104-1	28-101-2	29-119-1	45-149-3	47-129-1	47-129-9	47-129-10	53-107-1	54-101-3	54-104-1	55-111-1	56-119-1	TOTAL	GRAND TOTAL
UNIDENTIFIED																
Amorphous	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1	14
TOTAL	3	2	1	1	1	5	1	3	7	1	13	4	12	1	55	--
GRAND TOTAL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	161