INTRODUCTION

The purpose of this research plan is to outline the research methods to be used in the Phase I/II archaeological survey of the Route 13 Relief Route and to provide a framework within which to consider the cultural significance of archaeological resources affected by the project. This research plan will outline significant archaeological research questions for the Delaware Coastal Plain, for both the prehistoric and historic periods, and will identify those types of archaeological sites that are most likely to provide data germane to those questions. Thus, this framework is designed to be part of the evaluation of the effects of the proposed Route 13 Relief Route on known significiant or potentially significant cultural resources as defined by the National Register of Historic Places (36 CFR 60) and provided for under section 106 of the National Historic Preservation Act.

The U.S. Route 13 Relief Route project is a study of alternatives to relieve the present and projected traffic conditions on U.S. Route 13 in central Delaware. The proposed alternatives are for a 58-mile limited access facility highway extending from Tybouts Corner on the north, where new Delaware Route 7 improvements are to terminate, to the Frederica and Felton areas south of Dover, including U.S. Routes 13 and 113. The regional context of the proposed project area is shown in Figure 1, Project Location Map. The final highway will consist of four lanes with a median divider.

The project study area, identified as the Route 13 Corridor and shown in Figure 2, was defined to include the areas 2 to 3 miles on either side of the existing U.S. Route 13 from Tybouts Corner at the northern end to the areas around Frederica and Felton along U.S. Routes 113 and 13 south of Dover. The area is characterized by farmland, forest, and wetlands with concentrations of residential, commercial, industrial, and public service uses in and around Dover, Odessa, Smyrna, and Middletown. The largest community and the main urban area within the study area is the Dover/Camden/Wyoming area, with a total population of over 61,000 people. It is also the most diverse of the communities in the study area with significant residential, commercial, industrial, and institutional development.

Smyrna/Clayton, Middletown and Odessa are the other major communites in the study area. Smyrna/Clayton is a residential and agricultural community with a population of over 12,000 people while Middletown has around 9,000 people. Odessa while smaller, is an important enclave of historic homes a few of which date from the colonial period. Significant commercial activity in Smyrna is located on Route 13. The areas around Dover have been growing rapidly in the past 15 to 20 years, with single-family home subdivisions being the largest land use. Continued growth is expected in these areas, along with commercial activities to serve the residential population. Areas west of Route 13 within the study area, away from the built-up municipalities, tend to be devoted to farming activities; areas

FIGURE 1

Project Location Map

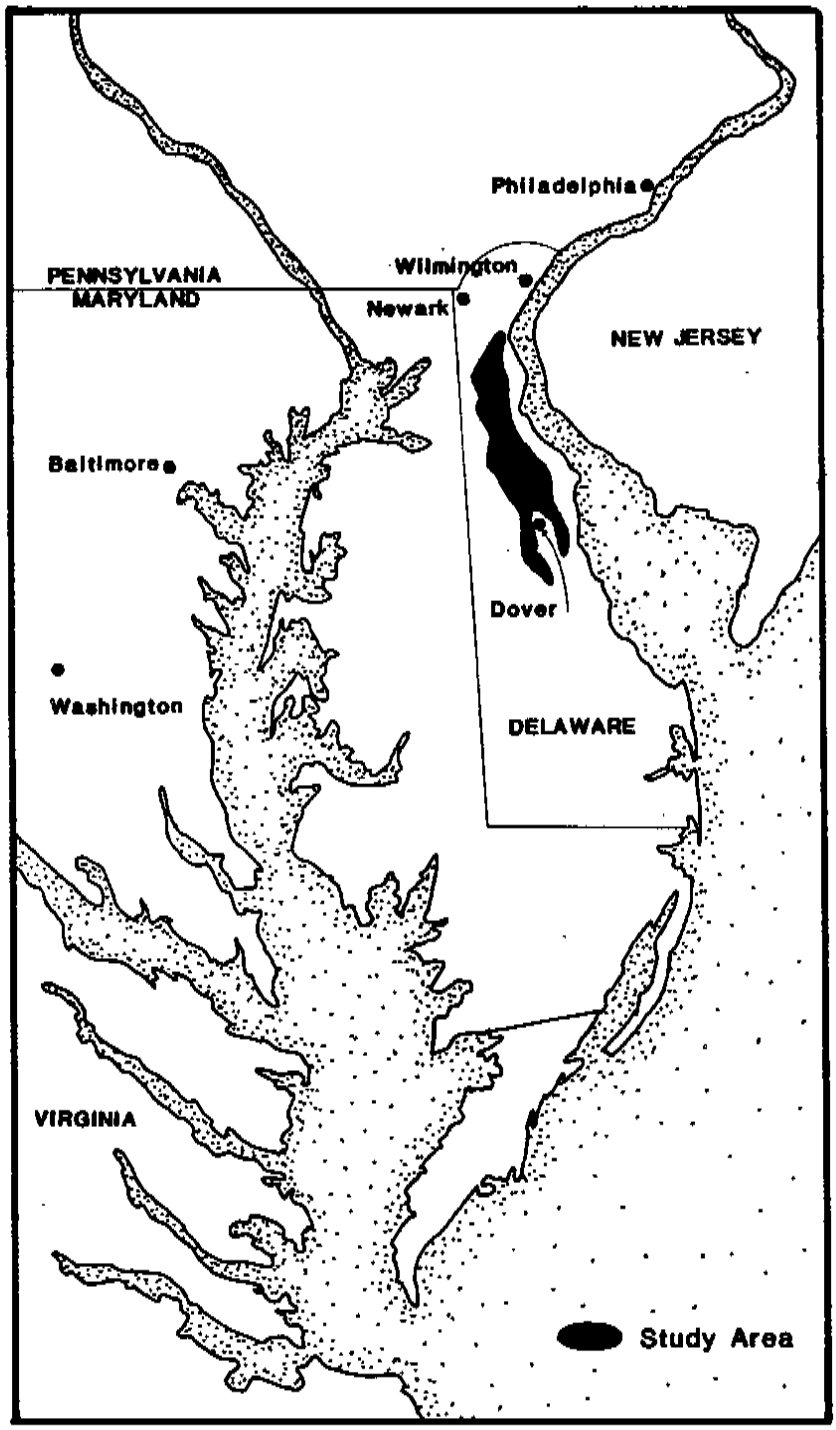
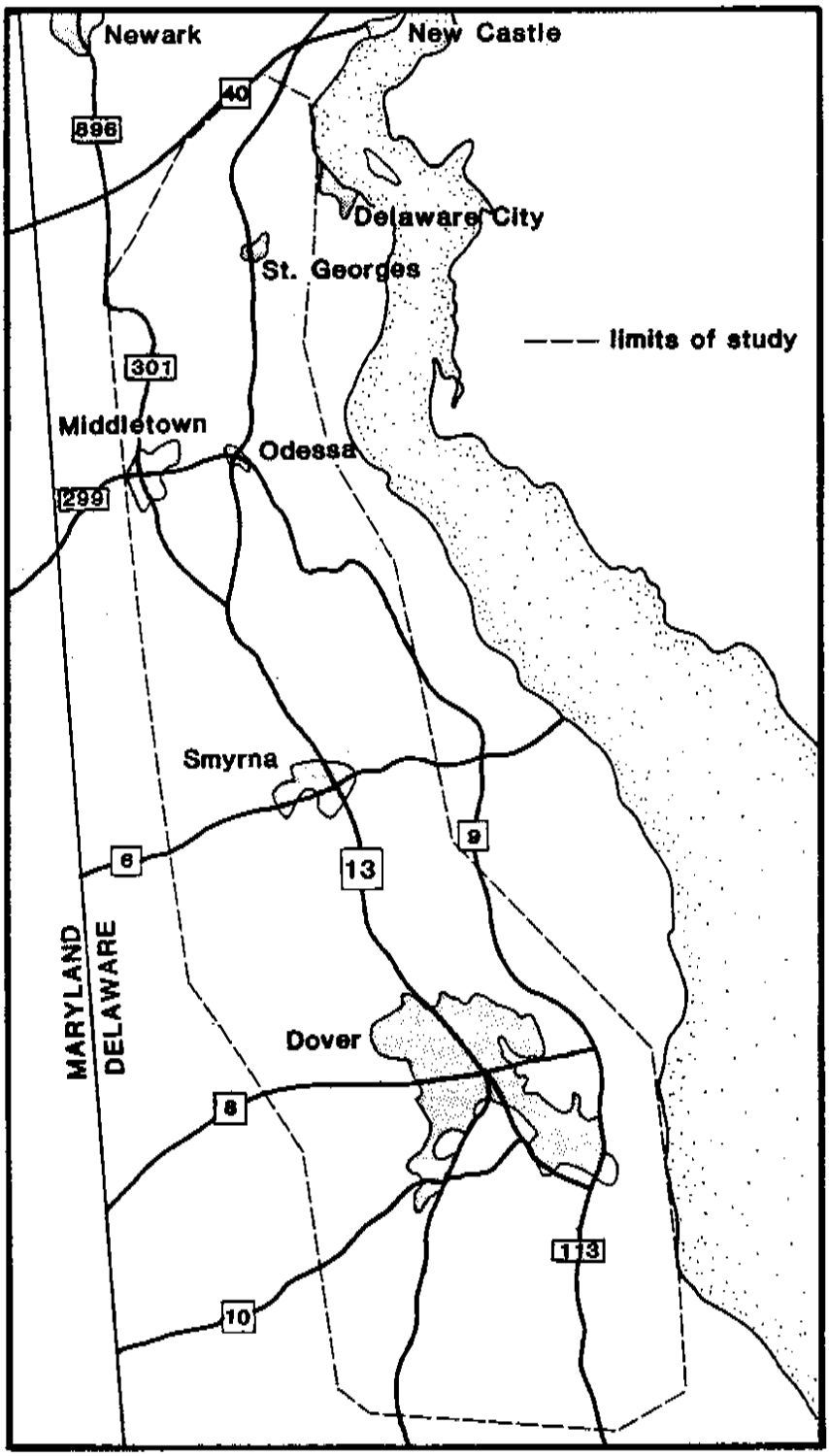


FIGURE 2

U.S. Route 13 Study Area



on the eastern side of the study area are generally devoted to farming and wetland areas.

PREVIOUS ARCHAEOLOGICAL STUDIES

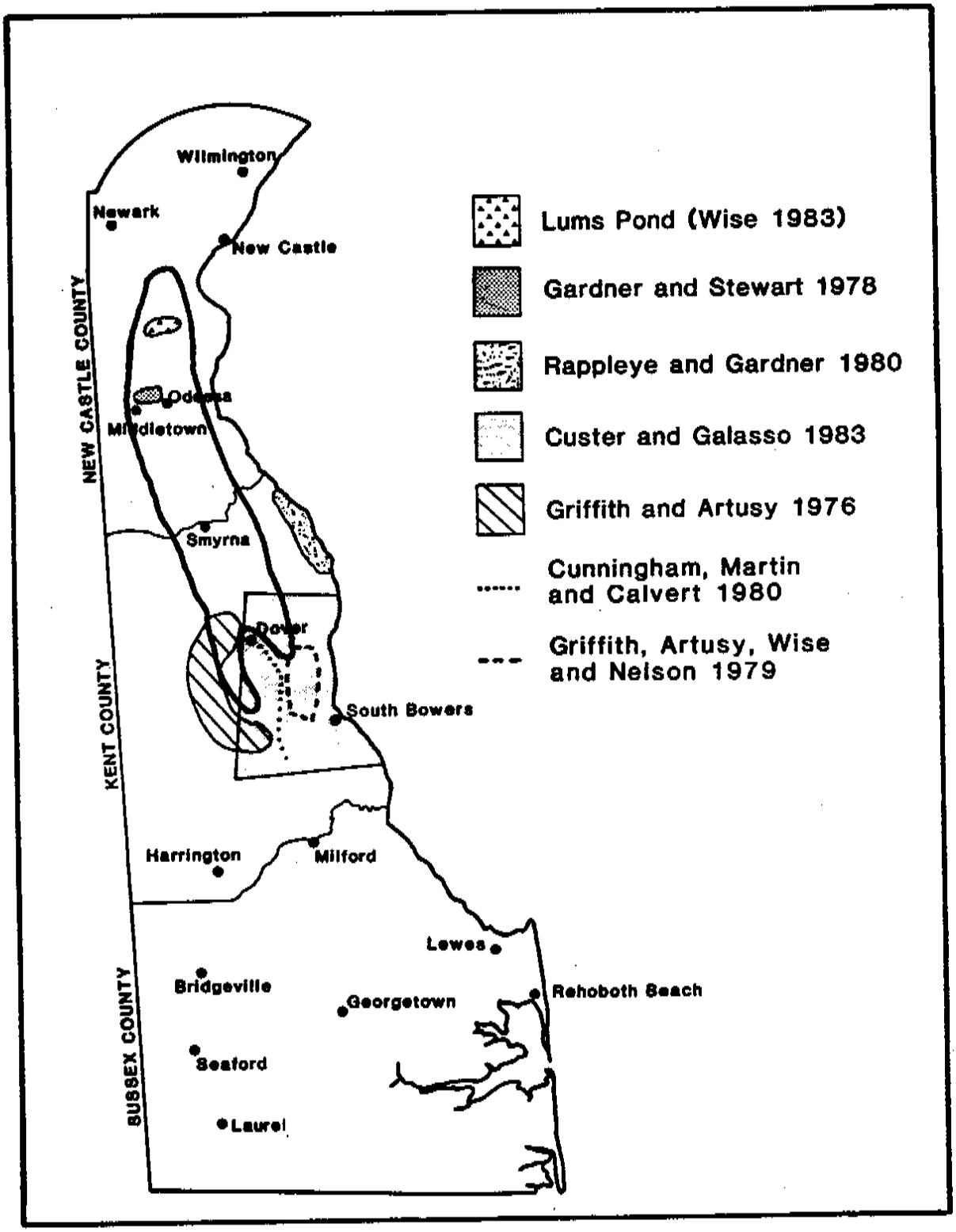
Prior to the beginning of the Route 13 planning study several archaeological studies had been carried out within the project study area (Figure 3). These studies include an archaeological survey of Lums Pond State Park (Wise 1983), a survey of the dualization of Route 113 in Dover (Cunningham et al. 1980), a sewer line survey of the north bank of the Appoquinimink River between Middletown and Odessa (Gardner and Stewart 1978), a survey of cultural resources of St. Jones Neck (Delaware Division of Historical and Cultural Affairs 1979), a survey of portions of the Bombay Hook National Wildlife Refuge (Rappleye and Gardner 1980), a controlled sample survey of selected portions of the St. Jones and Murderkill drainages (Custer and Galasso 1983), and a survey of an early proposed alignment of the West Dover By-Pass (Griffith and Artusy 1976). Most of these studies dealt primarily with prehistoric archaeological resources; however, comprehensive architectural surveys of standing structures in Kent and New Castle Counties by the Delaware Bureau of Archaeology and Historic Preservation (BAHP) provided a data base on potential historic archaeological site locations.

To date, three cultural resource planning surveys have been carried out for the Route 13 Corridor. The first study (Custer et al. 1984) was an overview of the entire corridor and provided a guide to known locations of historic and prehistoric cultural resources. All known prehistoric archaeological sites were plotted on a series of attachment maps (Custer et al. 1984: Attachment I) and inventoried (Custer et al. 1984:149-155). In addition, a series of predictive maps (Custer et al. 1984: Attachment V) were developed utilizing synoptic analysis of LANDSAT sattelite imagery and logistical regression statistical techniques (Custer et al. 1984:76-102; Custer et al. 1986; Eveleigh et al. 1983; Eveleigh 1984). The predictive maps differentiated among areas with a greater than .75 probability of containing prehistoric sites, areas with a .50 to .75 probability, and areas with a prehistoric site probability of less than .50. Preliminary tests of the model indicated that the predictions were more than 90% accurate and accounted for more than 80% of the variability in the site location data.

All known standing structures in the study area recorded in the BAHP inventories were listed (Custer et al. 1984:193-215), tabulated (Custer et al. 1984:36-43), and mapped (Custer et al. 1984: Attachment II). Additionally, houses, farm complexes, stores, and other buildings recorded on early atlases of the project area, such as the Beers Atlas (1868), Rea and Price Atlas (1849), and Byles Map of Kent County (1859), were plotted (Custer et al. 1984: Attachment III) and listed (Custer et al. 1984: Appendix III). This data base provided a fairly complete sample of the project study area's potential historic archaeological

FIGURE 3

Previous Archaeological Studies



site locations. Each site was then assigned a significance rating based on its general potential for providing intact archaeological deposits and its potential for yielding data applicable to current research questions. And these significance ratings were mapped (Custer et al. 1984: Attachment IV). Areas with similar site significance from the pre-1800 and post-1800 eras were then mapped (Custer et al. 1984: Attachments VI and VII) as areas of different historic site location potential. Finally, areas with high prehistoric and historic site potential were plotted as cultural resource "sensitivity zones" (Figure 4). The result was the mapping of a series of areas where it was highly likely that the construction of Route 13 would adversely affect significant cultural resources.

In order to provide more specific cultural resource planning information to guide alignment selection and highway design, field survey of the 13 most sensitive areas delimited by the initial planning study was undertaken. Table 1 lists the sensitive areas and Figure 5 shows their location. For the most part the most sensitive areas are associated with the locations where the proposed corridor crosses the region's major drainages. The Blackbird area is somewhat different in that it focuses on an area with many bay/basin features. Each area was subjected to field survey including surface survey and subsurface testing. Private artifact collections from sites in the areas were catalogued and analyzed. All potential historic site locations identified by BAHP standing structure inventories and historic atlases within the sensitive areas were field checked for their archaeological potential.

The results of these surveys were documented in two separate reports (Custer and Bachman 1986; Custer, Bachman, and Grettler 1986) and included detailed maps of cultural resources in each of the study areas. These maps were designed to provide information for highway planners when they determined the final alignments in the sensitive area. A summary of these findings (Custer and Cunningham 1986) was included as a technical support document for the Final Environmental Impact Statement and did help to minimize impact on the more important archaeological resources. However, because the adverse effects of the project on cultural resources had to be considered along with adverse effects upon wetlands, farmlands, and existing homes and businesses, not all adverse effects on cultural resources could be avoided.

THE ROLE OF A RESEARCH PLAN AND ARCHAEOLOGICAL RESOURCE MANAGEMENT PLAN

The next step to be undertaken in the archaeological research will be a Phase I field reconnaissance survey of the final alignment selected for construction. Figure 6 shows a plot of the most recently identified center line and the proposed impact zone extends approximately 200' to either side of this line. Some segments of the final alignment have already been surveyed during the planning survey of sensitive areas. Table 2 lists the prehistoric archaeological sites which are within the

FIGURE 4

Composite Map of Cultural Resources

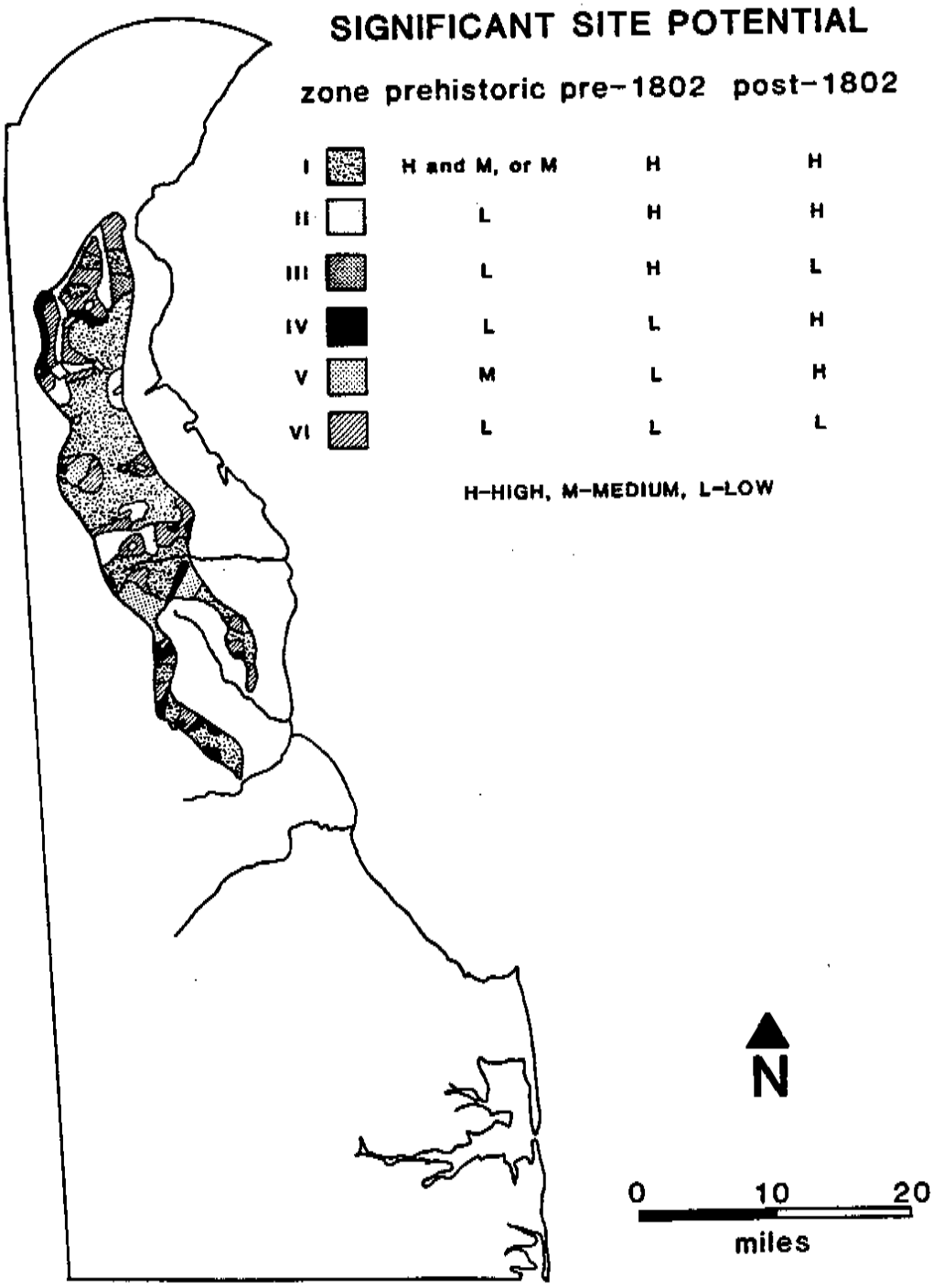


FIGURE 5

Sensitive Area Locations

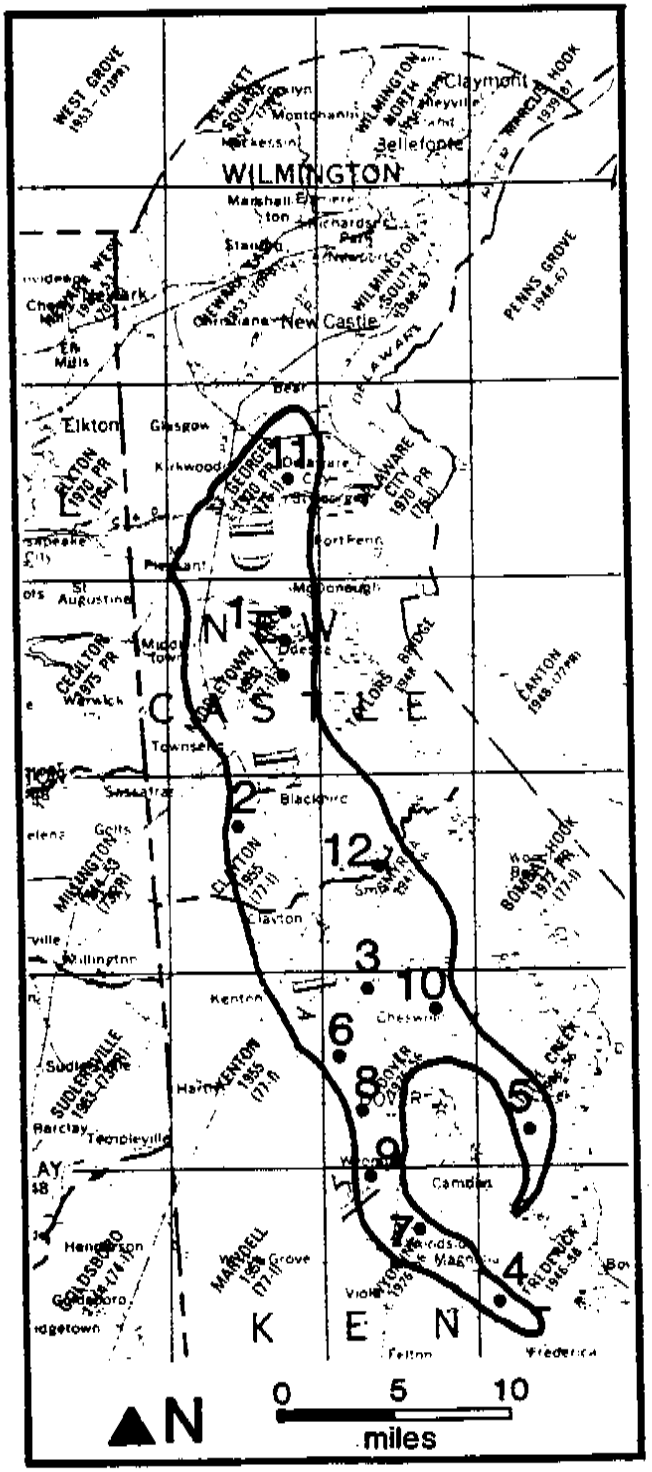


TABLE 1

SPECIAL CULTURAL RESOURCE AREAS

1) Appoquinimink
2) Blackbird
3) Leipsic
4) Double Run/Spring Creek
5) Little River/Pipe Elm Branch
6) Hughes Crossing
7) Derby Pond
8) Chestnut Grove
9) Wyoming Lake
10) Dyke and Muddy Branches
11) St. Georges
12) Smyrna

FIGURE 6

Final Alignment – Route 13 Corridor

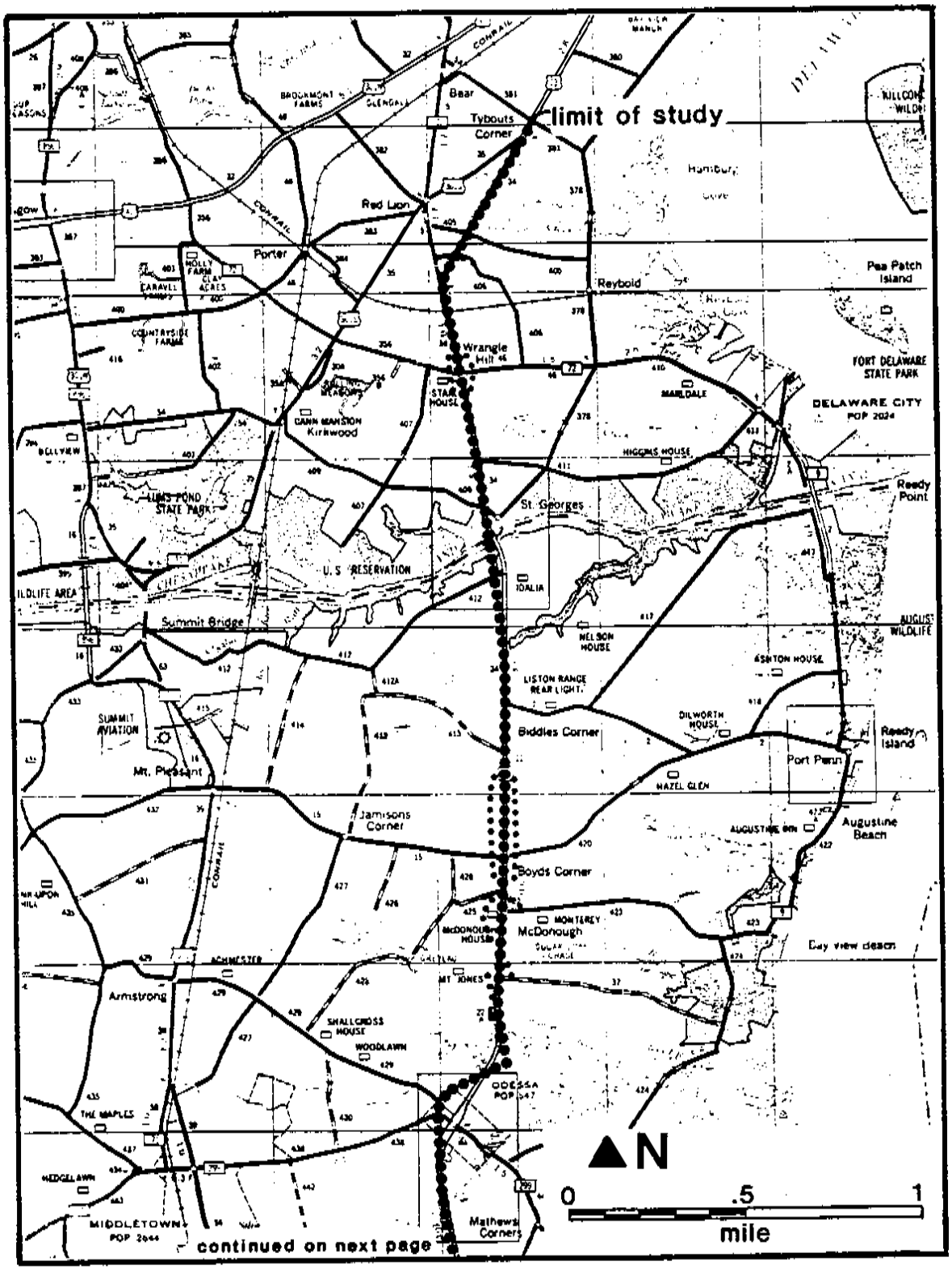


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FIGURE 6 CONTINUED

Final Alignment – Route 13 Corridor

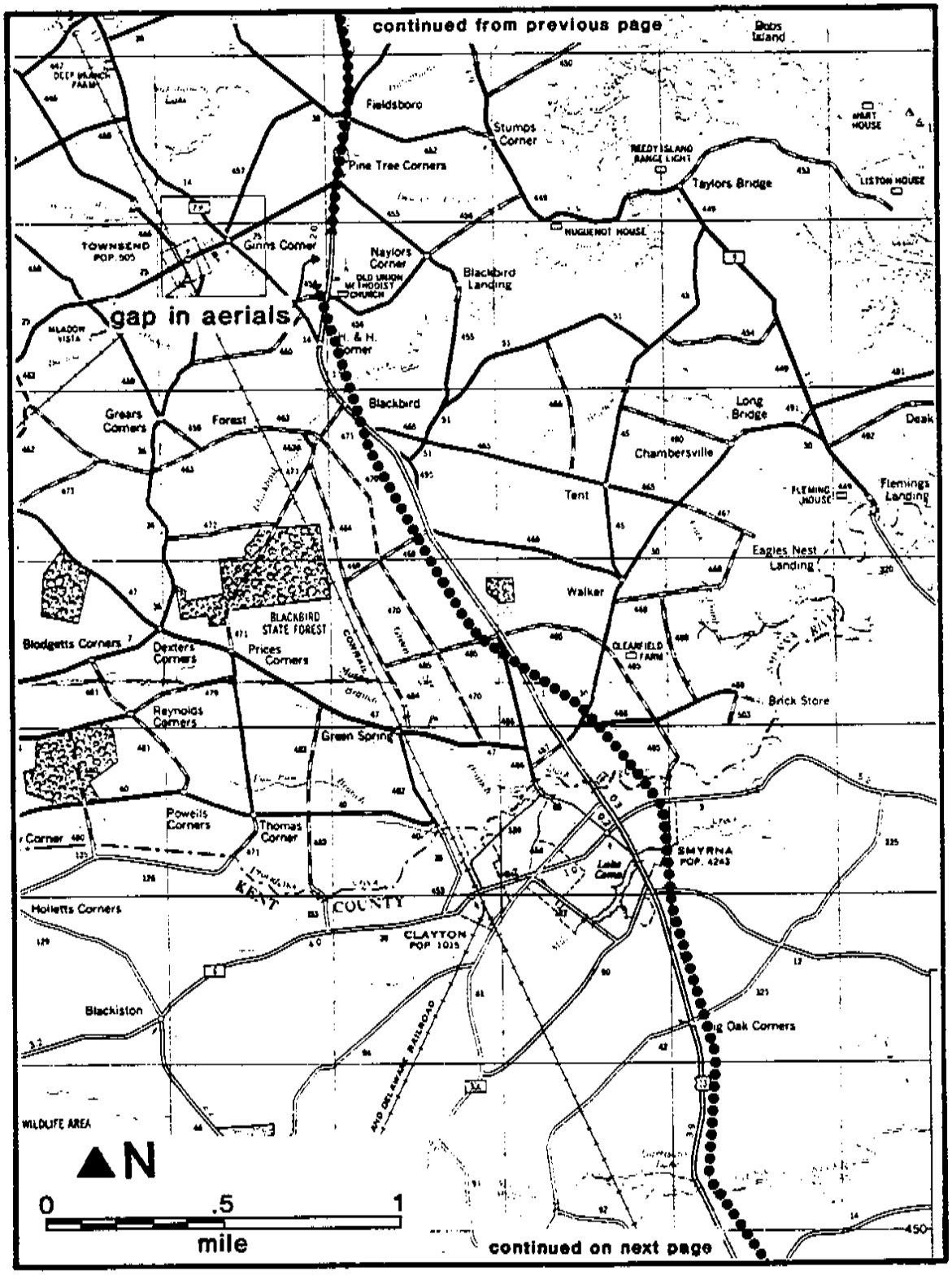

FIGURE 6 CONTINUED

Final Alignment – Route 13 Corridor

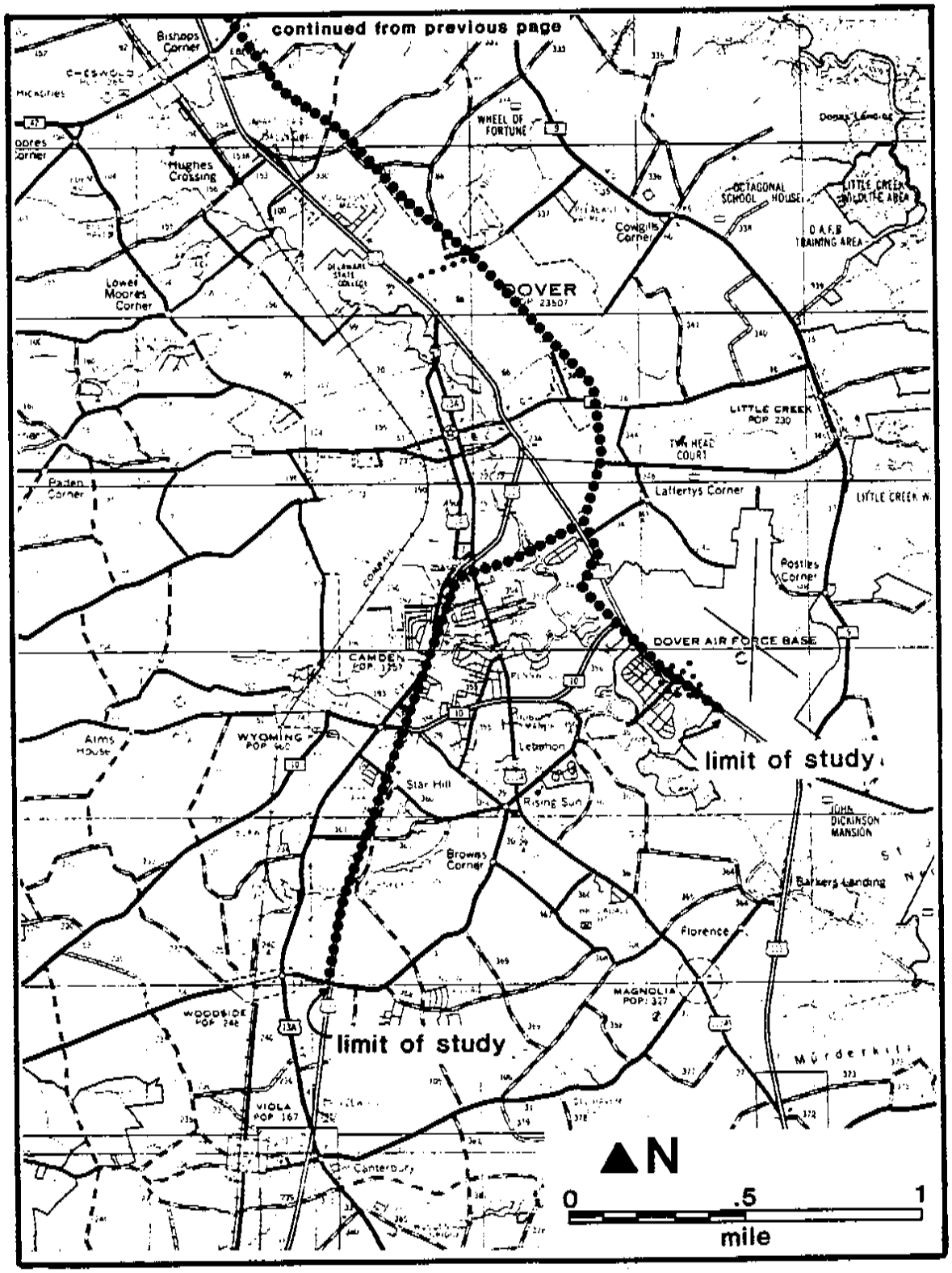

TABLE 2

PREHISTORIC SITES WITHIN THE DIRECT IMPACT ZONE

	PERIOD	COMPLEX
7NC-G-21	no information available on microfiche	
7NC-J-49	---	prehistoric flakes and historic
7NC-J-48	---	---
7NC-J-93	---	---
7NC-J-97	---	---
7NC-J-99	Archaic	---
7NC-J-134	---	---
7NC-J-135	---	---
7NC-J-136	---	---
7K-C-194	---	---
7K-C-204	---	---
7K-C-203	---	---
7K-C-207	---	---
7K-C-208	---	---
7K-D-22	no information available on microfiche	
7K-D-3*	Woodland I	Carey/Wolf Neck Delmarva Adena
7K-C-51	no information available on microfiche	

* - National Register (--- dash means flakes, Fcr, and other non-diagnostics were the only artifacts recovered)

final alignment and Table 3 lists historic sites. Figure 7 shows the location of the prehistoric sites and Figure 8 shows the location of the historic sites. Nonetheless, large portions of the alignment, at least 80% of the total, have not yet been surveyed. Because much of the unsurveyed portion of the alignment passes through high and medium probability zones for both historic and prehistoric cultural resources, it is expected that the field reconnaissance survey will find many new archaeological sites.

All Phase I and II testing will build upon the preliminary planning studies and background research accomplished to date for the segment (Custer et al. 1984; Custer and Bachman 1986; Custer, Bachman, and Grettler 1986; Custer and Cunningham 1986) and will comply with the standards for field investigations outlined by the Advisory Council for Historic Preservation (36 CFR Part 66 Draft: App. B). Phase I research methods will consist of pedestrian survey of the entire right-of-way (ROW). Special care will be taken when areas of predicted high site potential are surveyed. These high potential areas have been identified for both prehistoric and historic sites in prior studies. When necessary, subsurface testing will be undertaken in order to

TABLE 3

HISTORIC RESOURCES ROUTE 13 DIRECT IMPACT ZONE

SITE	DATE	FUNCTION	TYPE
1040	1868-93	AGTEN	HA
1032	1849-68	AGTEN	HA
3	p1849	AGTEN	HA
1033	1849-68	AGTEN	HA
1034	1849-68	AGTEN	HA
N-1492	1800-25	EST	SS?
33	P1868	AGTEN	HA
34	P1849	AGTEN	HA
35	P1849	AGTEN	HA
36	P1849	AGTEN	HA
N-1235	1790	AGCX	SS?
37	1849-68	AGTEN	HA
1041	1849-68	AGTEN	HA
1042	1868-93	AGTEN	HA
38	P1849	AGCX	SS?
122	1849-68	AGCX	HA
103	P1849	AGTEN	HA
116	1849-68	AGCX	HA
114	P1849	CHUR,CEM	HA
N-5181	P1849	AGCX	SS?
N-5187	P1849	AGCX	SS
N-5156	P1849	AGCX	SS
N-5154	1849-68	AGCX	SS
N-424*	mid 18th cen.	DWCX	SS
188	1849-68	STRUC	HA
187	1849-68	DWCX	HA
186	P1849	SCH	HA
189	1849-68	DWCX, TENANT	HA
914	1868-93	AGTEN	HA
190	1849-68	TENANT	HA
191	1849-68	TENANT	HA
855	1849-68	AGCX	HA
853	1849-68	DWCX	HA
852	1849-68	STO,DWCX	HA
1052			HA
847	1849-68	PO, WKSH	HA
846	1849-68	AGTEN	HA
N-5889	19th cen.	DWCX, AGCX	SS?
851	1868-93	DWCX	HA
848	1849-68	STO	HA
250	P1849	SCH	HA
275	1849-68	SCH	HA
N-5875	1905	CHUR, CEM	HA
N-5876	P1868	DWCX, COMM	SS?
885	1868-93	STRUC	HA
845	1849-68	AGCX	SS
SITE	DATE	FUNCTION	TYPE

TABLE 3 (cont.)

HISTORIC RESOURCES ROUTE 13 DIRECT IMPACT ZONE

SITE	DATE	FUNCTION	TYPE
844	1868-93	DWCX	HA
843	1868-93	DWCX	HA
842	1849-68	AGTEN	HA
284	P1849	AGCX	SS?
327	1849-68	AGCX	HA
326	P1849	SCH	HA
325	1849-68	AGCX	HA
N-6272	P1849	AGCX	SS
416	1849-68	AGCX	HA
K-996		DW	SS
K-487			SS?
K-1009	1945	MANUFY	SS?
K-1003	1900-10	DWCX	SS?
K-1004	1900	STRUC	SS?

KEY TO TABLE 3

AGCX	-	Agricultural Complex
AGTEN	-	Agriclutural Tenant Dwelling/Farm
BRID	-	Bridge
CEM	-	Cemetary
CHUR	-	Church
COMM	-	Commerical Structure
DWCX	-	Dwelling Complex
DW	-	Dwelling
EST	-	Estate
MANUFY	-	Manufactory
PO	-	Post Office
SCH	-	School
SERVST	-	Service Station
STO	-	Store
STRUC	-	Structure
TENANT	-	Tenant House
WKSH	-	Workshop

* - NATIONAL REGISTER
SS - STANDING STRUCTURE
? - POSSIBILY REMOVED STRUCTURE
HA - HISTORIC ARCHAEOLOGICAL

FIGURE 7

Location of Prehistoric Sites in Final Alignment

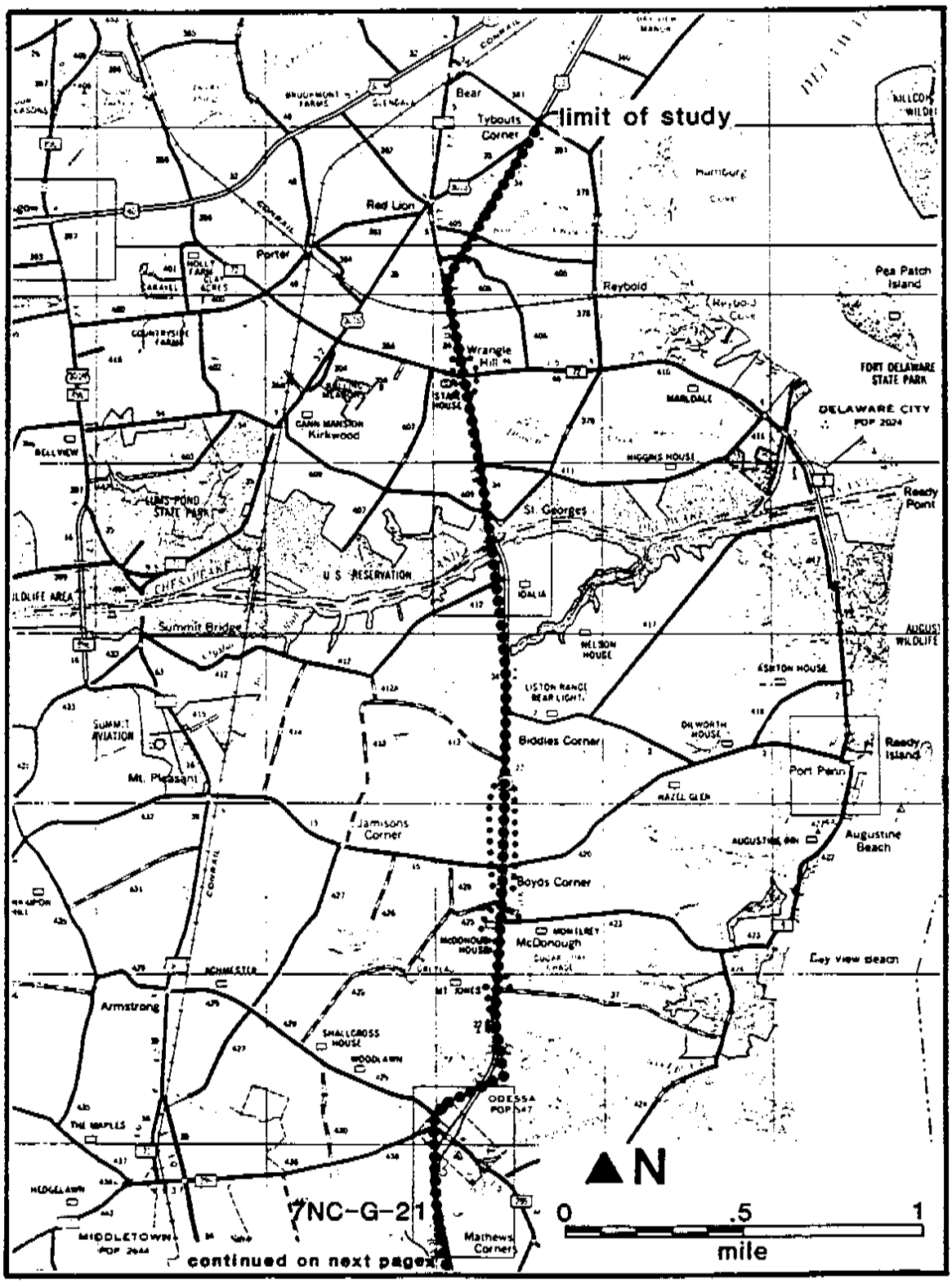

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FIGURE 7 CONTINUED

Location of Prehistoric Sites in Final Alignment

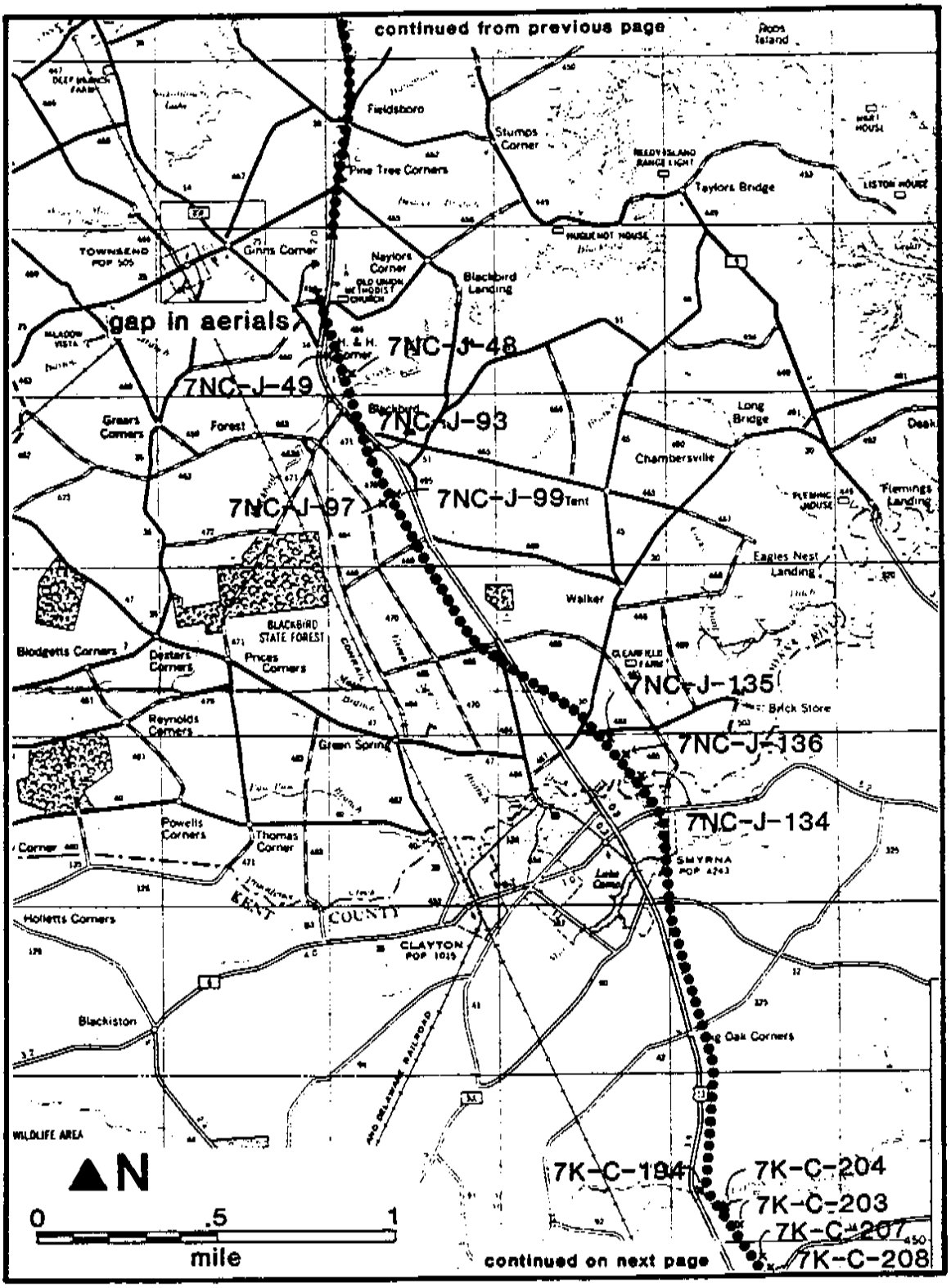


FIGURE 7 CONTINUED

Location of Prehistoric Sites in Final Alignment

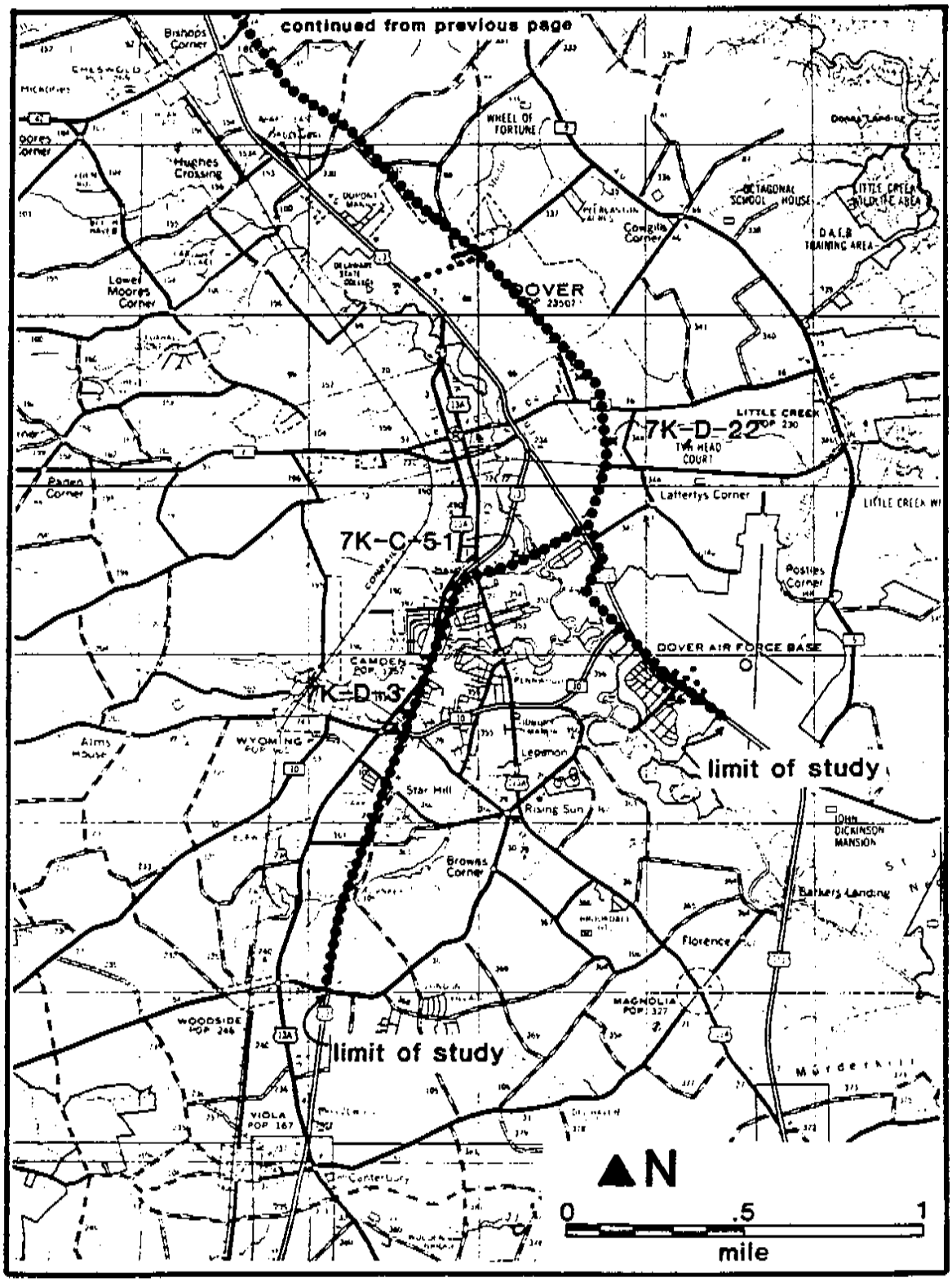


FIGURE 8

Location of Historic Sites in Final Alignment

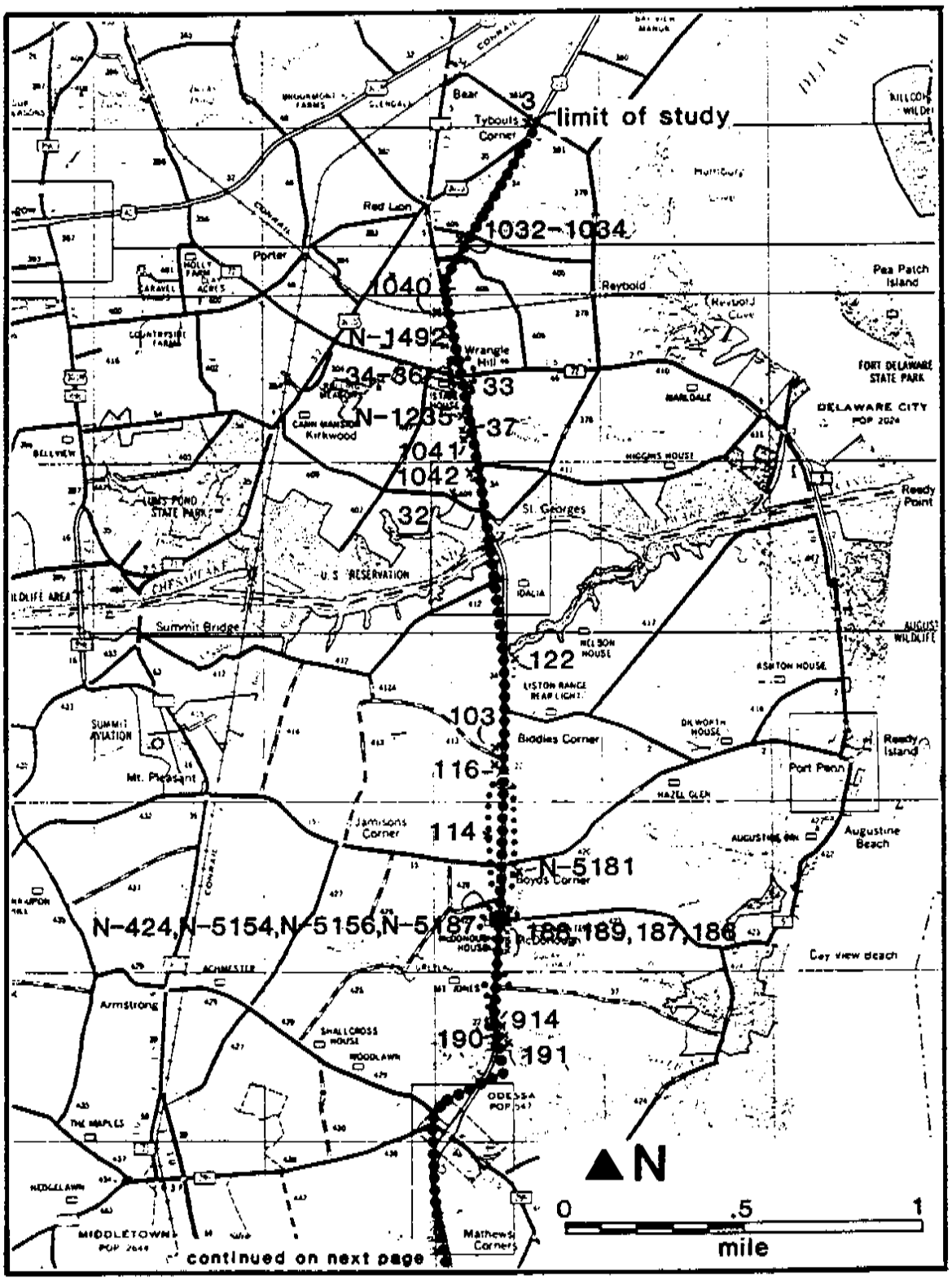


FIGURE 8 CONTINUED

Location of Historic Sites in Final Alignment

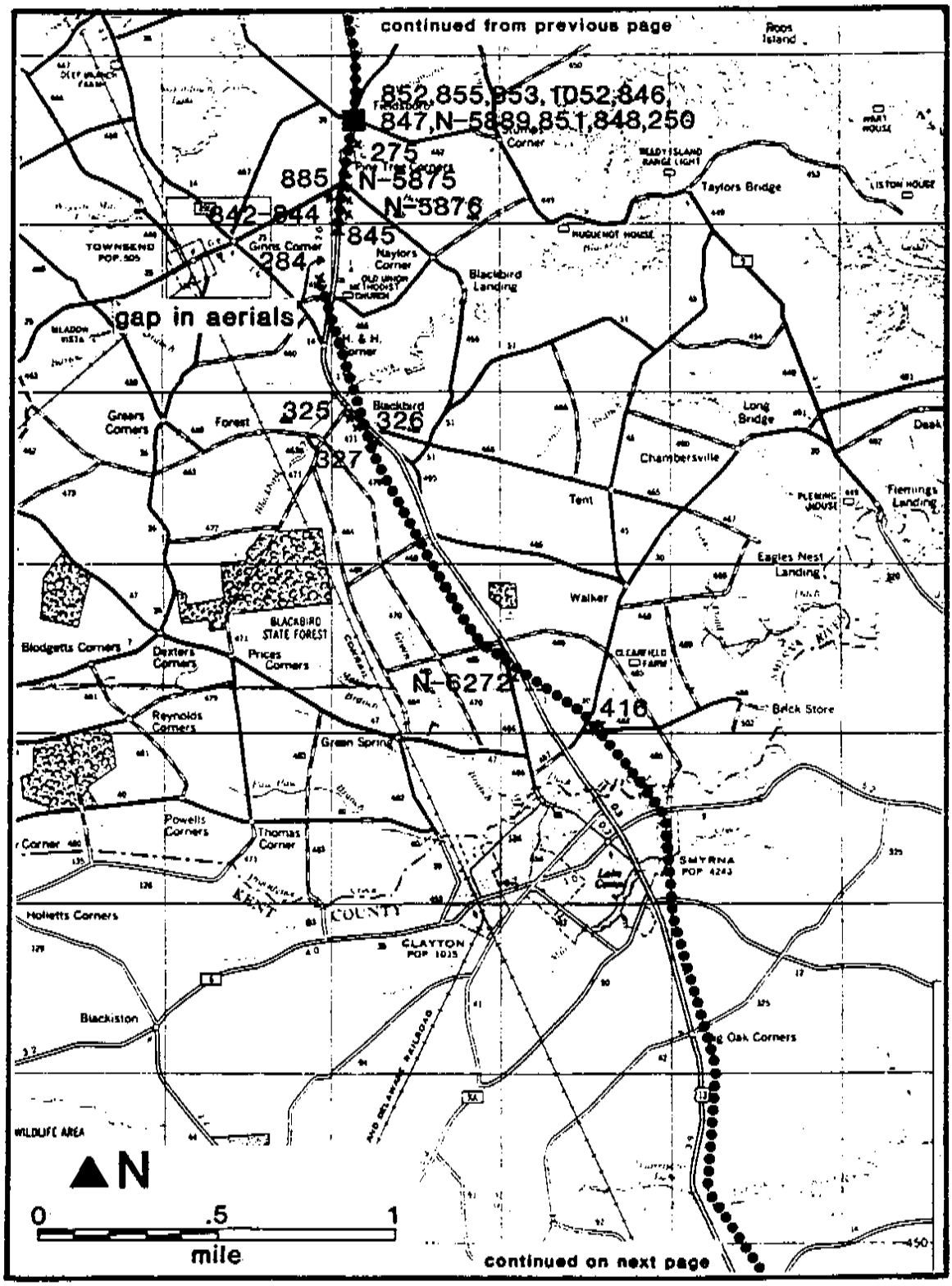
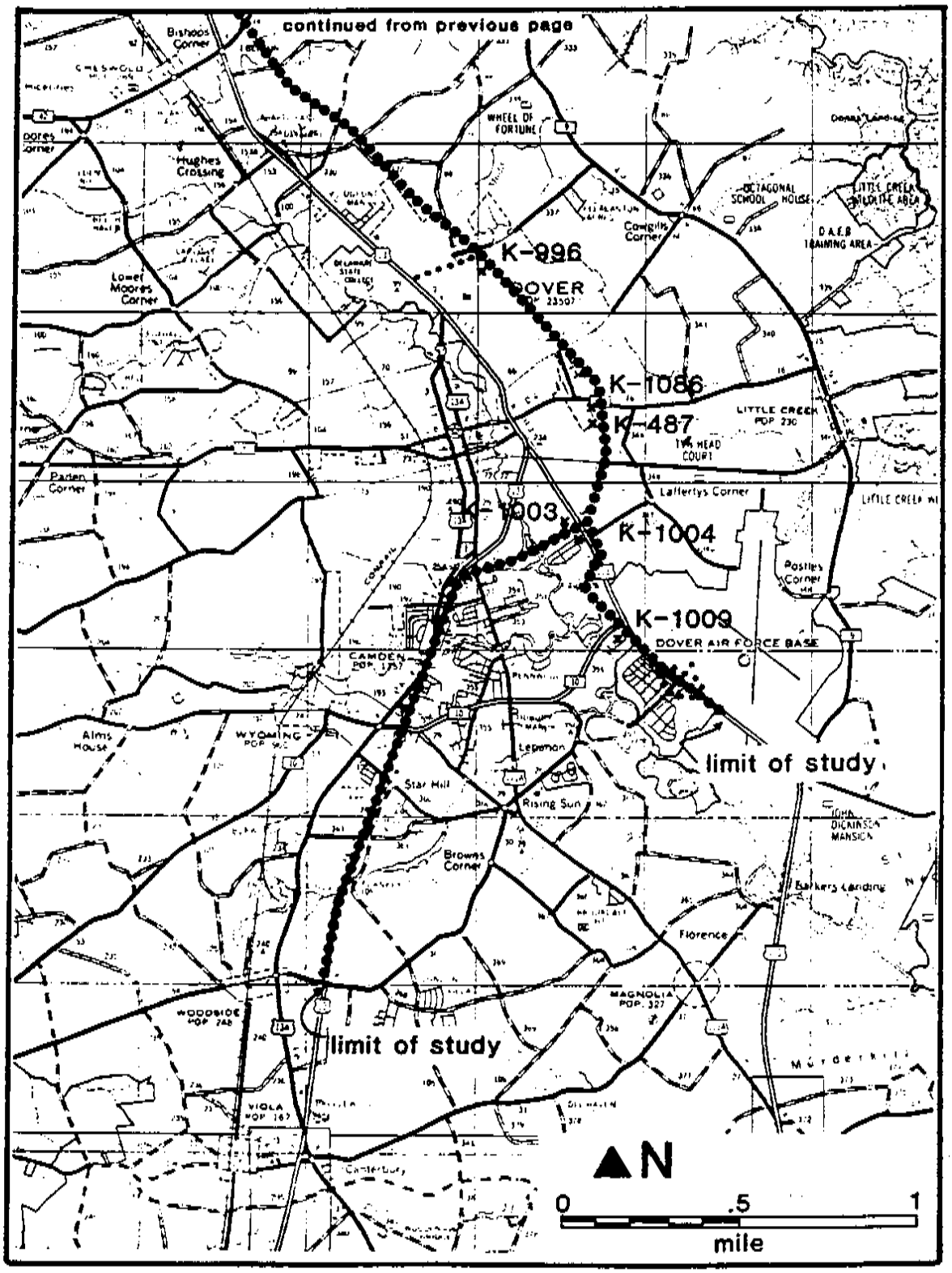


FIGURE 8 CONTINUED

Location of Historic Sites in Final Alignment



identify sites where landscapes are buried or where vegetation cover is heavy. Special attention will be taken in the testing of areas where the potential for unplowed and buried landscapes is high. It should also be noted that remote sensing survey, such as magnetometer work, may be necessary to search for submerged vessels in the vicinity of the historic landings.

The sites identified during the Phase I survey of the final alignment will have to be evaluated for their eligibility for listing in the National Register of Historic Places in a Phase II site investigation survey. In the case of archaeological sites, eligibility for the National Register of Historic Places is determined by the potential of a site to produce data germane to recognized research questions of interest (Raab and Klinger 1977; King, Hickman, and Berg 1977). Therefore, there is a critical need to identify the major regional research questions for the Route 13 Corridor. This plan will identify these research topics and will outline the types of historic and prehistoric archaeological sites which may be likely to provide data pertinent to these research questions, and which may be eligible for listing in the National Register of Historic Places given that the sites possess sufficient integrity. It is hoped that listing of research questions, and classes of potentially significant archaeological sites, will facilitate the development of determination-of-eligibility documentation and Phase III data recovery survey proposals.

It is expected that Phase I testing will identify all sites with the final alignment and provide an initial assessment of which sites will require Phase II testing. For some prehistoric sites, such as small upland lithic scatters in plowed areas with no subsurface integrity, there is no need for a detailed Phase II study to determine their significance. However, all prehistoric sites which exhibit either the potential for subsurface integrity, complex internal site structure, or large numbers of artifacts will be subjected to Phase II testing. For historic sites, of the sites in the final alignment identified during Phase I survey a sample will be selected for Phase II testing. All historic sites predating 1780 will be subjected to Phase II testing along with a large proportion of historic sites dating between 1780 and 1830. A stratified sample of historic sites dating between 1830 and 1900 would be subjected to Phase II testing and the sample could be stratified by functional types noted in Table 2, such as agricultural tenant, estate, owner-occupied agricultural complex, non-agricultural dwelling, store, and post office/workshop. No twentieth century sites and no service stations, schools, bridges, churches, or historic cemeteries will be subjected to Phase II testing. Site integrity and location with respect to the final alignment right-of-way will also be considered with respect to the sampling design.

Phase II testing will consist of intensive test excavations which will determine the eligibility of the sites discovered during Phase I testing for listing on the National Register of Historic Places. Specifically, Phase II testing will determine

the contextual integrity of sites, their spatial limits with respect to the proposed ROW, and their research significance. Specific field methods used at each site will vary, but generally they will include shovel test pits at regular intervals, 1-meter square test units, and controlled surface collections. It should also be noted that prior research has shown that a large, although undertermined, number of bay/basin features are found within the proposed ROW (Figure 9). These sites are the locus of many prehistoric sites and the bay/basin features are themselves important sources of paleoenvironmental information, such as pollen and macrofossils (Custer and Bachman 1986). Therefore, collection and analysis of fossil pollen data and geomorphological data from these features is necessary within the context of Phase II archaeological testing.

One prehistoric archaeological site, Carey Farm (7K-D-3), listed on the National Register of Historic Places will be impacted by the project (Figure 10). Phase II study of this site will require better definition of the site's limits so that the effects of the project upon the site can be determined and the need for data recovery addressed.

ENVIRONMENTAL SETTING

Before discussing the cultural resources, it is necessary to consider the environmental setting of the study area. In order to understand the regional prehistory of the present study it is first necessary to review the region's environments through time. The present study area is located in Delaware's High Coastal Plain. For the study of the prehistoric and historic resources of the region, a number of varied environmental zones are recognized in the High Coastal Plain (Figure 11). Each of these zones is described below and the descriptions are derived from the work of Custer (1984a).

High Coastal Plain - Located between the Fall Line and the Smyrna River, the High Coastal Plain represents the southeastern extension of the coarse gravels of Pleistocene (Columbia) sediments in Delaware (Jordan 1964:40). A rolling topography is present and elevation differences range up to 16 meters (50 feet) from the headlands bordering high order streams and adjacent floodplain marshes. These differences are sufficient to cause differential distributions of plant and animal species (Braun 1967:246-247). Watercourses are deeply incised and are lined by a veneer of relatively recent sediments that is thin along the upper reaches of the drainages and thickens moving toward their mouths (Kraft et al. 1976:13). Most streams are not tidal and the freshwater/saltwater mix allows for a wide range of resources. Soils include a variety of well-drained and poorly drained settings that are distributed in a mosaic pattern across the region.

Low Coastal Plain - The Low Coastal Plain includes most of Kent County and most of the project area. It is underlain by the sands of the Columbia Formation which have been extensively

FIGURE 9

Final Alignment and Potential Bay/Basin Sites

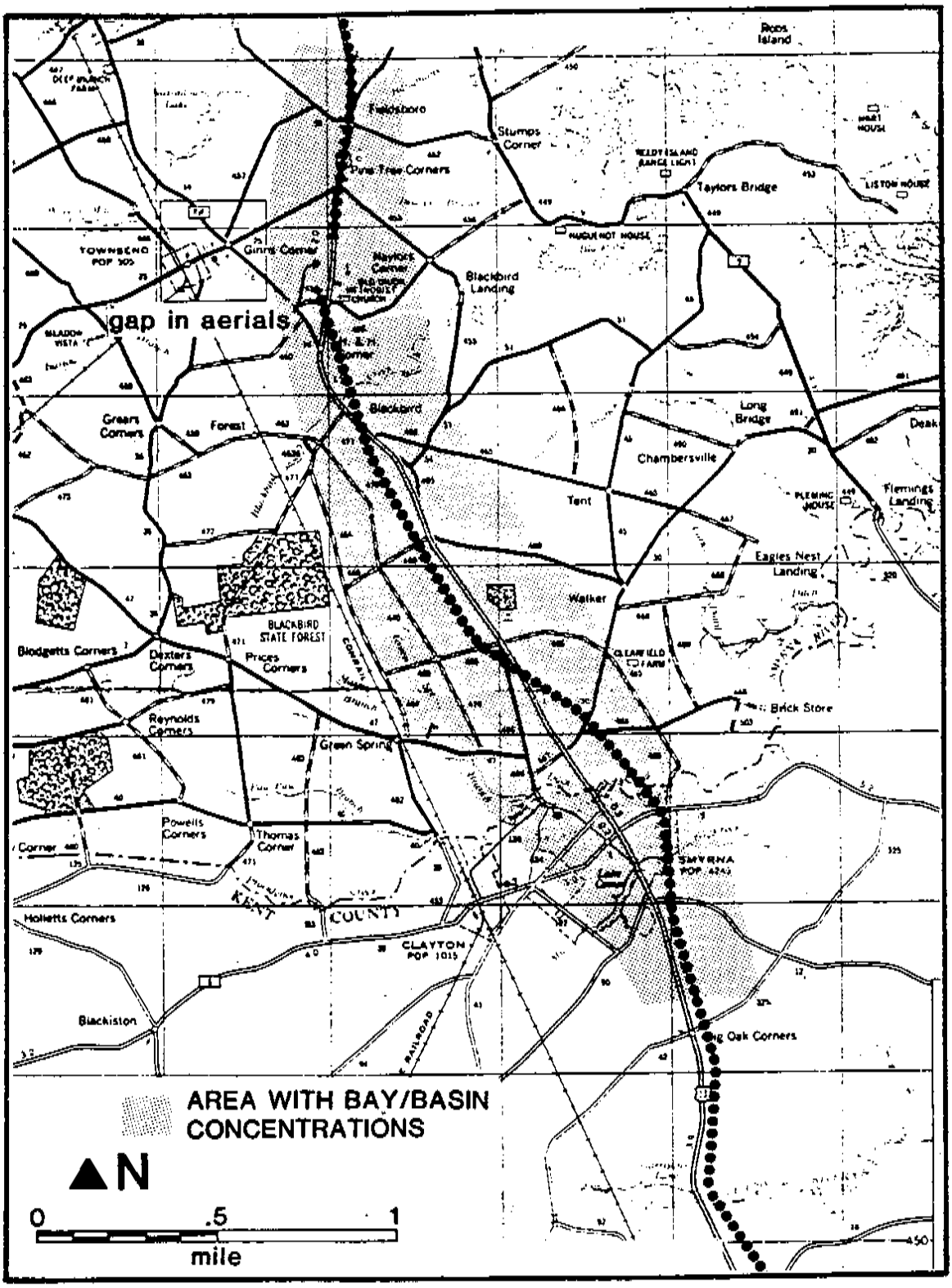


FIGURE 10

Carey Farm Site Location

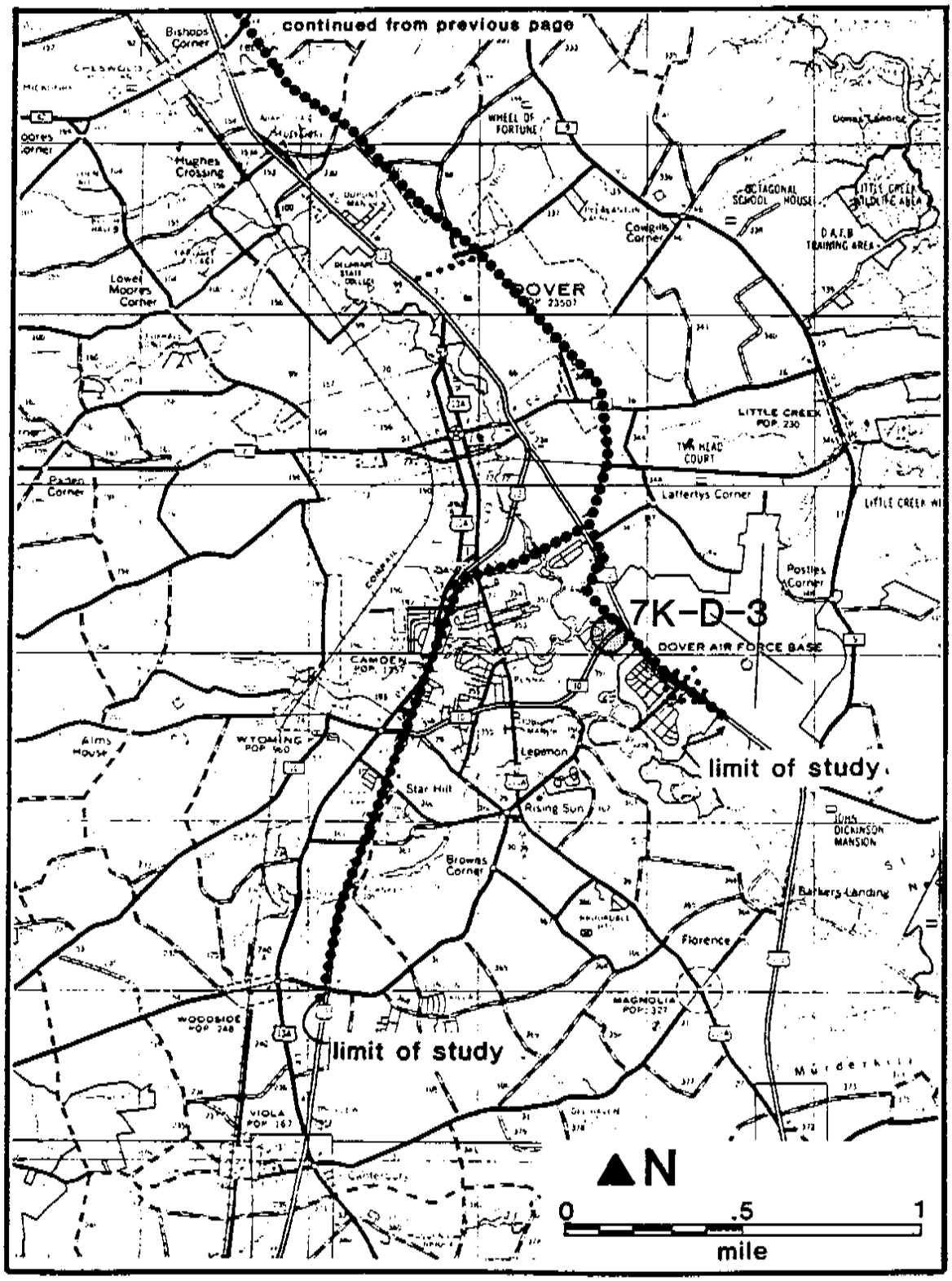
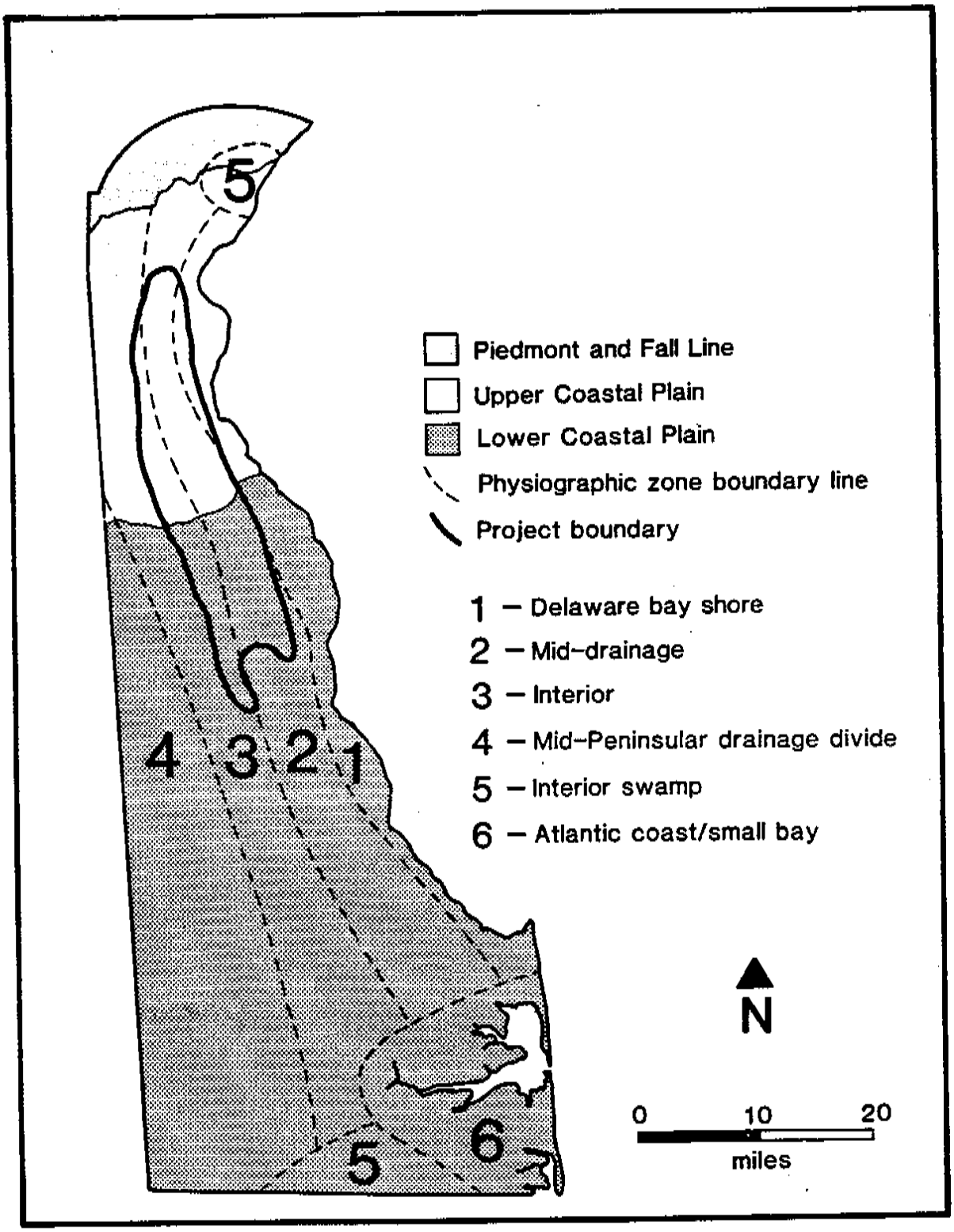


FIGURE 11

Environmental Zones



reworked to a very flat and relatively featureless landscape (Delaware Geological Survey 1976). Elevation differences range up to 10 meters (30 feet) and these small differences are moderated by long and gradual slopes. River systems are tidal through most of their middle and lower reaches with extensive marshes found along the Delaware Bay. These riverine systems would combine a wide variety of evironmental settings and resources and are especially attractive human habitation areas. Much of the area is well-drained; however, there are some extensive areas of poor drainage.

Although these two major physiographic zones provide one way of organizing a study of the Coastal Plain's cultural resources, they do obscure some additional significant environmental differences. These additional sources of environmental variability are generally distributed in broad belts parallel to the Delaware River and Bay shore. Each is described below and depicted in Figure 11.

Mid-Peninsular Drainage Divide - Representing the "spine" of the Delmarva Peninsula, this area is defined by the stretch of low, rolling topography that separates the headwaters of streams that drain into the Delaware River from streams that drain into the Chesapeake Bay. Elevation differences are slight and flowing surface water is restricted to the low order headwaters of the larger streams and rivers. Additional water sources of this zone include a number of swamps that have formed in areas of poorly drained soils surrounded by sand ridges. Bay/basin features, known locally as "whale-wallows", represent another water source in this area. Geomorphological evidence indicates that they were formed during the Pleistocene and many seem to have held water, at least seasonally, ever since (Rasmussen 1958:82). The combination of headwater drainages, swampy areas, and bay/basin features with interspersed well-drained areas creates a mosaic of edaphic settings. Only a small section of the project area, between Pine Tree Corners and Flemings Landing falls within this zone.

Delaware Shore - Included in the Delaware Shore zone are the remnant terraces of the Delaware River as well as the various tidal marshes that fringe the Delaware River and the Delaware Bay. These marshes are found throughout the area and often extend well up the drainages from the river and bay shore. Soils in the area are generally poorly drained; however, pockets of well-drained soils in the areas of higher elevation may be found. Only the eastern edges of the project area are included in this zone.

Mid-Drainage - The Mid-Drainage zone is located between the Delaware Shore and Mid-Peninsular Drainage Divide zones and includes the majority of the study area. The modern tidal limit along the drainages marks the center of this zone and the major drainages and their tributaries are fresh throughout the inland portion of the zone. Some tidal marshes and poorly drained floodplains are found along the major drainages. Well-drained

soils are found on upper terraces of the drainages and on isolated headlands between the major drainages and their tributaries. The extensive combination of brackish and freshwater resources makes this zone one of the richest in Delaware for hunters and gatherers and most of the final alignment falls within this zone.

It should be noted that the locations of these zones have not remained constant since the end of the Pleistocene because some zones have been subjected to extensive landscape modification. The most important factor in this landscape modification is post-Pleistocene sea level rise. Kraft et al. (1976) note that sea level has been rising along the Atlantic Coast for the past 12,000 years and this sea level rise has transformed the Delaware River of 10,000 B.C. into the current drowned estuary. Many old land surfaces have become submerged and the configuration of the Delaware River and Bay have changed dramatically. In terms of the study area, these effects would be most prevalent in the eastern half of the Mid-Drainage zone and the River Shore zone.

PREHISTORIC ARCHAEOLOGICAL RESOURCES

The following discussion of prehistoric cultural resources consists of two parts: a brief summary of the local prehistory, and a discussion of regional research questions that pertain specifically to Delaware's Coastal Plain with a listing of the classes of prehistoric archaeological sites which are most likely to contribute data pertinent to these research questions.

REGIONAL PREHISTORY

This summary of the regional prehistory is abstracted from Custer (1984a). The prehistoric archaeological record of the Delaware Coastal Plain can be divided into four large blocks of time: The Paleo-Indian Period (ca. 12,000 B.C. - 6500 B.C.), the Archaic Period (6500 B.C. - 3000 B.C.), the Woodland I Period (3000 B.C. - A.D. 1000), and the Woodland II Period (A.D. 1000 - A.D. 1650). A fifth time period, the Contact Period may also be considered and spans from A.D. 1650 to A.D. 1750, the approximate date of the final Indian habitation of Delaware in anything resembling their pre-European Contact form. Each of these periods is described below.

Paleo-Indian Period (12,000 B.C. - 6500 B.C.) - The Paleo-Indian Period encompasses the time period of the final retreat of Pleistocene glacial conditions from Eastern North America and establishment of more modern Holocene environments. The distinctive feature of the Paleo-Indian Period is an adaptation to the cold, and alternately wet and dry conditions at the end of the Pleistocene and the beginning of the Holocene. This adaptation was primarily based on hunting and gathering with hunting providing a large portion of the diet. Hunted animals may have included now-extinct megafauna and moose. A mosaic of