ENVIRONMENTAL SETTING

PHYSIOGRAPHY AND TOPOGRAPHY

The project area is within the Atlantic Coastal Plain Physiographic Province, which is generally characterized by low-lying, nearly level topography. The Coastal Plain was formed by the deposition of material transported from beyond the Fall Line, and it is characterized by masses of unconsolidated sediments comprised of sands, gravels, and clays of marine or fluvial origin. Surface elevations within the Route 113 study area range from approximately 30 to 60 feet above mean sea level (msl), with the majority of the study area lying between 40 and 50 feet above msl.

Delaware may be divided into physiographic zones of similar geography and topography that are useful for discussion of prehistoric cultural manifestations (Custer 1986). The Route 113 corridor falls within the Mid-Peninsular Drainage Divide physiographic zone, which has been described as the "backbone" of the Delmarva Peninsula (Thomas 1966:3, in Custer 1986). This zone is defined by the Atlantic-Chesapeake watershed line that separates the headwaters of streams that flow toward the east and empty into the Delaware Bay and those that flow to the west through Maryland and empty into the Chesapeake Bay (Ireland 1974). The northern section of the Route 113 survey area is drained by headwaters and high-order tributaries of the Mispillion River and Cedar Creek, which empty into the Delaware Bay. The southern section is drained by headwaters and high-order tributaries of the Nanticoke River, which empties into the Chesapeake Bay.

In addition to flat topography and slow-moving headwaters of the streams that empty into the Delaware and Chesapeake bays, the Mid-Peninsular Drainage Divide zone is also characterized by swamps surrounded by sand ridges and by bay/basin features (Custer 1986).

SOILS

The Route 113 corridor crosses four principal soil associations: (1) the Sassafras-Fallsington association, (2) the Evesboro-Rumford association, (3) the Pocomoke-Fallsington- Evesboro association, and (4) the Fallsington-Pocomoke-Woodstown association (Ireland 1974).

The Sassafras-Fallsington association occurs only in the northern end of the Route 113 study area, where it is centered on the headwaters of the Mispillion River and its tributaries. This association occurs with a landscape of broad plains with scattered shallow depressions and relatively few streams. It includes well-drained to poorly drained soils that have a moderately permeable subsoil of sandy loam to sandy clay loam (Ireland 1974).

The Evesboro-Rumford association occurs in two sections of the Route 113 study area: in the north, it is centered on the headwaters of Cedar Creek, while in the southern section, it is centered on the headwaters of Gravelly Branch. The Evesboro-Rumford is the largest soil association in Sussex County and is associated with landscapes that are generally quite level but with occasional ridges, depressions, and moderate to steep slopes along major drainages. The Evesboro-Rumford association has excessively drained surface soils and a rapidly permeable subsoil (Ireland 1974).

The Pocomoke-Fallsington-Evesboro association is the most extensive within the Route 113 study area; it occupies the central portion of the study area, centered on Ellendale, as well as a lengthy section of the alignment between Redden Crossroads and Georgetown. The Pocomoke and Fallsington soils make up three- fourths of this association, and they are poorly drained, with moderately permeable subsoils. The Pocomoke and Fallsington soils occupy flat areas where the water table is at or near the surface for long periods. The Evesboro soils make up roughly 10 percent of the Pocomoke-Fallsington-Evesboro association, and they are excessively well drained with a rapidly permeable subsoil (Ireland 1974).

The Fallsington-Pocomoke-Woodstown association occupies a short length of the Route 113 corridor north of Redden Crossroads as well as the extreme southern terminus of the study area, north of Georgetown. This association occurs in nearly level headwater flats associated with high-order natural drainages; numerous depressions are also found in these areas. The dominant soils in this landscape, Fallsington and Pocomoke, are poorly drained, with a water table at or near the surface for much of the year. The Woodstown soils are moderately well drained, but have a perched water table within two feet of the surface for part of the year (Ireland 1974).

The individual soils that have been mapped within the Route 113 survey area are listed in Table 1, together with a brief description of their major characteristics.

PALEOENVIRONMENT

Given the widespread evidence of human occupation of the Middle Atlantic Coastal Plain beginning as early as the Late Pleistocene, a reconstruction of the area's environmental history should consider at least the last 12,000-15,000 years. The primary factors to be considered in a local paleoenvironmental reconstruction are changing climatic conditions and sea levels which, in turn, influenced the local distribution of floral and faunal resources.

During the late Pleistocene, a series of massive continental glaciers advanced and retreated over much of North America. Because vast amounts of water were incorporated into these ice sheets, the sea levels were 300 to 500 feet lower than at present. The late Pleistocene was not only slightly

TABLE 1

CHARACTERISTICS OF SOILS IN THE RT. 113 CORRIDOR

SOIL NAME	DRAINAGE CLASS	REMARKS
Elkton sandy loam (El)	poor	occurs on upland flats and in slight depressions
Evesboro loamy sand (EsD, EvA, EvB)	excessive	occurs on uplands
Fallsington sandy loam (Fa)	poor	water table at or near surface for long periods
Johnston silt loam (Jo)	very poor	occurs on floodplains; wet for long periods
Kalmia sandy loam (Ka)	well drained	occurs on uplands
Kenansville loamy sand (KbA)	well drained	occurs on uplands
Klej loamy sand (Kl)	poor-moderate	occurs on uplands; seasonally wet
Matawan loamy sand (Mm)	moderate	occurs on uplands
Pocomoke sandy loam (Pm)	very poor	occupies nearly level upland flats
Rumford loamy sand (RuA, RuB, RuC)	well-drained	occurs on uplands
Sassafras sandy loam (SaA, SaB)	well-drained	occurs on uplands
Swamp (Sw)	n/a	areas of prolonged standing water
Woodstown sandy loam (Wo)	moderate	occurs on uplands

Source: Ireland (1974).

cooler than the present, but was also characterized by higher levels of precipitation (Carbone 1976).

The generally accepted marker for the end of the Pleistocene is the beginning of the glacial retreat immediately following the Valders substage maximum, which has been dated radiometrically to about 10,500 years B.P. (Bryson et al. 1970). As the sea levels rose with the release of the glacial meltwater, the ancestral Susquehanna River Valley and the Delaware River Valley were drowned, and the rising water eventually formed the estuarine environments of the Chesapeake Bay and the Delaware.

While data indicate that sea level has been rising continuously during the past 12,000 to 14,000 years, the rate of marine transgression over the Coastal Plain has varied considerably. In the millennia immediately following the glacial maxima, sea levels rose relatively rapidly, while in the most recent millennia, sea levels have been rising at a rate of somewhat less than one foot per century (Edwards and Merrill 1977).

The biogeographical patterns of the Middle Atlantic Coastal Plain for the late Pleistocene have not yet been definitively reconstructed. Detailed paleoenvironmental syntheses have been completed for the Shenandoah Valley (Carbone 1976) and the Upper Delaware Valley (Dent 1979). These studies are useful for under-standing regional paleoenvironmental conditions; however, a reconstruction of local conditions should also consider applicable pollen cores. For Delaware, Custer (1984, 1986) relies heavily on Carbone's (1976) work and discusses paleoclimatic history in terms of an episodic model wherein abrupt, rather than gradual, changes in climate influenced the regional biogeography.

Custer's (1984, 1986) discussion of the Lower Coastal Plain paleoenvironmental sequence would be most suitable for the Route 113 study area, as there is scant information to treat separately the Mid-Peninsular Drainage Divide physiographic zone. Pollen samples were recovered from the Dill Farm Site, located in southern Kent County, and these would pertain directly to the Mid-Peninsular Drainage Divide zone. It should be noted, however, that the Dill Farm sequence does not encompass the entire Late Glacial and Holocene time span, and its utility is therefore somewhat limited. A summary of the paleoenvironmental history, based on Custer's (1984, 1986) statewide synthesis, is presented in Table 2.

MODERN ENVIRONMENT

Essentially modern environmental conditions were reached approximately 1,000 years before the present, that is, during the Sub-Atlantic episode. Some minor fluctuations have occurred since that time, but it is generally recognized that modern distributions of flora and fauna closely approximate those of the past thousand years. Of course, one must recognize the profound environmental changes that have occurred as a result of cultural modification of the landscape.

TABLE 2

PALEOENVIRONMENTAL EPISODES,
DELAWARE LOWER COASTAL PLAIN

EPISODE	DATES	GENERAL CHARACTERISTICS
Late Glacial	10,000-8,000 B.C.	Mosaic of different vegetational communities; open grasslands within coniferous forests; deciduous elements present in wetland areas, etc.; bay/basin features open and active; animals include cold-adapted megafauna (musk ox, mammoth, mastodon), peccaries, white-tailed deer, caribout, elk, beaver, etc.
Pre-Boreal/ Boreal	8,000-6,500 B.C.	Reduction of open grasslands and spread of forests dominated by pine and northern hardwoods; extinction of Pleistocene megafauna and reduction of habitat for grazing and browsing species
Atlantic	6,500-3,100 B.C.	Full appearance of modern environment with warm, moist conditions; continental climate with marked seasonal differences; widespread dominance of mesic oak-hemlock forests; modern faunal communities
Sub-Boreal	3,100-800 B.C.	Warm, dry climate (mid-postglacial xerothermic) at the beginning of the episode, followed by gradually increasing moisture and cooling temperatures; spread of grasslands and reduction of oak-dominated forests
Sub-Atlantic	800 B.C.-recent	Cooling reduced the moisture stress of the Sub-Boreal, leading to essentially modern conditions; upland forests include a mix of coniferous and deciduos species; reduction of sea level rise permits florescence of estuarine environments in coastal areas

Source: Custer (1984, 1986)

At the time of the initial European contact, the vegetative cover in the Middle Atlantic Coastal Plain was primarily a deciduous forest. This hardwood forest and its associated vegetation would have provided a fairly abundant supply of nuts, fruits, bulbs, and leaves. The terrestrial animals that inhabited the region included white-tailed deer, black bear, porcupine, squirrel, chipmunk, woodchuck, turtle, weasel, skunk, fox, wolf, cougar, raccoon, opossum, muskrat, otter, mink, beaver, turkey, shrew, rabbit, and bobcat (Turner 1976, 1978).

Oak would have been the dominant deciduous element in the forests surrounding the Route 113 vicinity, with an admixture of loblolly pine, Virginia pine, and other deciduous species. Poorly drained upland areas would have included pin oak, willow oak, red maple, sweetgum, blackgum, holly, sweetbay, dogwood, beech, birch, red cedar, and cypress (Custer 1984, 1986; Ireland 1974).

The current land-use patterns in the vicinity of the Route 113 alignment are predominantly rural in character. There are numerous residences and a few commercial establishments along the alignment, particularly in the outskirts of Milford, Ellendale, Redden, and Georgetown. The right-of-way passes through extensive areas of undeveloped woodland, particularly in the southern segment, between Ellendale and Georgetown. The northern segment of the alignment is more given to agriculture, with the principal crops being soybeans and corn.