

debitage, regardless of raw material, for analysis of flake size is likely to blur meaningful variability. Consequently, we have no plans to use the sewer line report's analytical approach to lithic artifacts to replace the UDCAR and DelDOT analytical methods used in this report.

In sum, the Lewden Green Site is viewed here as a micro-band base camp whose main occupation dates to the end of the Woodland II period. Figure 40 shows the distribution of the inferred activity areas at the site. In addition, the findings at the Lewden Green Site meet the expectations of the Northern Delaware Management Plan for all the time periods.

### **CONCLUSIONS**

The excavations at the Lewden Green Site provide data that have implications for a number of regional research issues and each of these issues is discussed below.

### **REGIONAL GEOMORPHOLOGY AND PALEOENVIRONMENTS**

The stratigraphic data from the Lewden Green Site is of interest with regards to regional trends in Holocene geomorphology. Soils data from Lewden Green indicate relative stability of the landscape around the site throughout the Holocene. In contrast, sedimentary data from some of the high bluffs overlooking the Christina River and Churchman's Marsh indicates pronounced alterations of landscapes, primarily through aeolian processes throughout the Holocene (Custer and Watson 1987). The Lewden Green Site differs from the bluffs in that it is on a low-lying gentle slope close to the drainage.

FIGURE 41  
Christina River Cross-Section

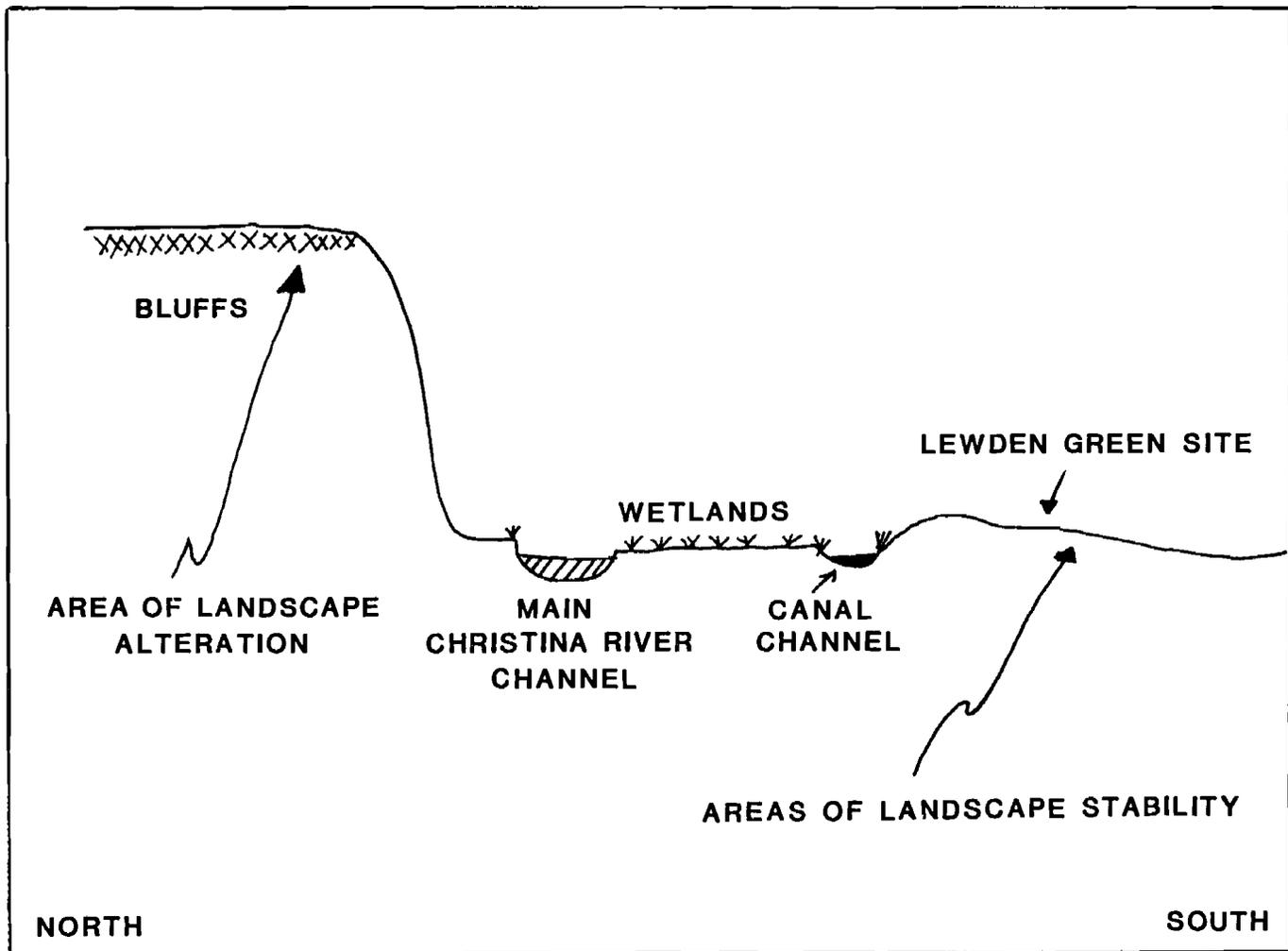


Figure 41 shows a cross-section of the Christina River in the vicinity of the Lewden Green Site and shows the location of areas with landscape stability and those where landscape alteration took place during the Holocene. On the bluffs, a thin veneer of reworked Holocene soils have a spotty distribution with Pleistocene gravels often found close to the surface. However, the soils overlying the Pleistocene gravels are thicker. Also, the soils at Lewden Green have finer textures than those on the bluffs and seem to have higher moisture retention capacities. Brush (1982) has noted that soil moisture retention capabilities

are a major determinant of vegetation distribution patterns on the Delmarva Peninsula Coastal Plain and it is possible that the vegetation communities on the low-lying side of the Christina River at Lewden Green were more stable than the vegetation communities on the bluffs. During times of moisture stress, which seem to have occurred periodically during the Holocene, the vegetation on the bluffs may have died off more quickly, allowing for aeolian erosion and deposition. On the low-lying areas such processes may not have had a chance to occur.

If the above reconstruction is accurate, the upland area bounded by the Christina River, Churchman's Marsh, and the White Clay Creek would be an area with less stable vegetation communities and early seral stage communities. In contrast, the north bank of the White Clay Creek, the south bank of the Christina River, and interior areas would have had more stable, later seral stage vegetation communities. Figure 42 shows a reconstruction of the local middle Holocene environments which is a slightly revised version of an earlier reconstruction (Custer and Watson 1987:Figure 4). The main revision is the inclusion of the data on the low-lying areas north of the White Clay Creek and south of the Christina River.

It is interesting to note that the largest base camp sites are located in the area of the least stable vegetation communities (Custer and Watson 1987:Figure 1). This association may indicate a preference for settlement in the early seral stage woodlands which probably had a higher carrying capacity than the later seral stage communities. It is also possible that

intensive human habitation of the bluffs along the Christina River, White Clay Creek, and Churchman's Marsh may have played a role in the alteration of the vegetation and landscapes of these areas, as has been documented for areas of intensive prehistoric human habitation in Tennessee (Delcourt, Delcourt, Cridlebaugh, and Chapman 1986). Further local research focusing on the preservation and erosion of prehistoric landscapes and paleoenvironments will help to clarify our understanding of the prehistoric ecology of this region.

#### **LITHIC RESOURCE UTILIZATION**

The lithic resource use patterns from the Lewden Green Site can be compared to patterns from other local sites to understand prehistoric settlement patterns and group movements. Previous UDCAR/DelDOT studies have compared Woodland I sites (eg. - Catts, Hodny, and Custer 1989) and an extensive body of lithic resource data has been assembled. Table 9 shows the comparative lithic resource data and Figure 43 shows the sites from which they are derived. A difference-of-proportion test was used to compare percentages of cortex, cryptocrystalline use, and quartz and quartzite use among all of the sites. The difference-of-proportion test was applied to evaluate percentage differences due to the varied sizes of the artifact assemblages shown in Table 9. Results of the overall comparisons are noted and described in Catts et al. (1989:249-256, Appendix II) and here we only note the placement of the Lewden Green prehistoric assemblage in the lithic use classification system described in Catts et al. (1989:256, Table 20).

TABLE 9

## COMPARATIVE LITHIC RESOURCE USE

Site	Function	Total Artifacts	Cortex %	Crypto %	QtQz %	Ref.
<b>7NC-E-9</b>	<b>Micro B.C.</b>	<b>4090</b>	<b>14</b>	<b>81</b>	<b>18</b>	--
7NC-D-130	Staging	2051	13	59	37	9
7NC-D-137	Procure.	58	50	43	24	9
7NC-D-138	Procure.	54	0	59	23	9
7NC-D-140	Procure.	133	21	38	18	9
7NC-E-81	Procure.	155	9	66	12	7
7NC-D-129	Procure. Camp	1,749	6	76	24	5
7NC-E-46	Staging	10,512	20	22	69	1
7NC-D-54	Cobble Red. B.C.	1,288	28	32	59	2
7NC-D-55A	Cobble Red. B.C.	132	45	16	69	2
7NC-D-55B	Cobble Red. B.C.	2,304	29	8	88	2
7NC-D-62	Cobble Red. B.C.	475	41	17	78	2
7NC-E-6A Area 2A	Macro. B.C.	5,515	9	61	33	3
7NC-E-6A Area 2B	Macro. B.C.	6,206	8	80	23	3
7NC-E-6B	Macro. B.C.	2,949	13	49	15	3
7NC-D-5	Quarry Red.	94	0	60	32	4
7NC-D-3	Quarry Red.	368	0	51	38	4
7NC-D-19	Quarry Red.	653	0	74	26	1
7NC-D-100	Procure.	293	40	51	46	6

**Key:**

Crypto - Cryptocrystalline  
 QtQz - Quartz/Quartzite  
 Procure. - Procurement  
 Cobble Red. B.C. - Cobble Reduction Base Camp  
 Macro B.C. - Macro Base Camp  
 Quarry Red. - Quarry Reduction  
 Ref. - References  
 Micro B.C. - Micro Band Base Camp

**References:**

- 1 - Custer and Bachman 1984
- 2 - Custer, Sprinkle, Flora, and Stiner 1981
- 3 - Custer 1982
- 4 - Custer, Ward, and Watson 1986
- 5 - Custer, Watson, Hoseth, and Coleman 1988
- 6 - Shaffer, Custer, Grettler, Watson, and DeSantis 1988
- 7 - Catts, Rappleye-Marsett, Custer, Cunningham, and Hodny 1988
- 8 - Catts, Hodny, and Custer 1989
- 9 - Catts and Custer 1990

**TABLE 10**

**LITHIC RESOURCE USE CLASSIFICATION**

**CORTEX**

	<b>High</b>		<b>Low</b>
<u><b>CRYPTOCRYSTALLINE:</b></u>	7NC-D-100 (P)		<b>*7NC-E-9 (BC)</b>
<b>High</b>	7NC-D-137 (P)		7NC-E-6A(2A) (BC)
			7NC-D-19 (Q)
			7NC-D-129 (P)
			7NC-E-6A(2B) (BC)
			7NC-E-81 (P)
<b>Medium</b>			7NC-D-130 (H/S)
			7NC-D-138 (P)
			7NC-D-5 (Q)
			7NC-D-3 (Q)
			7NC-E-6B (BC)
			7NC-D-140 (P)
			7NC-D-54 (CBC)
			7NC-E-46 (H/S)
<b>Low</b>	7NC-D-55B (CBC)		
	7NC-D-55A (CBC)		
	7NC-D-62 (CBC)		

**Key:** BC - Base Camp  
 Q - Quarry  
 P - Procurement  
 CBC - Cobble Reduction Base Camp  
 H/S - Hunting/Staging Site  
 \* - Lewden Green Site

Table 10 shows the placement of the Lewden Green Site in the classification system with respect to cryptocrystalline and cortex frequencies. The Lewden Green Site falls in the grouping of sites with low cortex percentages and low cryptocrystalline percentages. The other sites in this category include base camps as well and it is interesting that the Lewden Green base camp is classified with other base camps even though it is younger than the other base camp sites in the sample. The categorization of the Lewden Green Site also underscores the importance of curated

cryptocrystalline tool kits even though cobble resources were major components of expedient tool kits. The presence of primary cryptocrystalline curated tools in the tool kits at Lewden Green also suggests that the groups living there had recently visited the areas of the Delaware Chalcedony Complex prior to their stay at Lewden Green. Similar movement patterns have also been noted for Woodland I groups and the data from Lewden Green support the notion that there was considerable continuity in adaptations between Woodland I and Woodland II groups in northern Delaware (Stewart, Hummer and Custer 1986).

#### **CORDAGE AND TEXTILE DATA**

This report is the first opportunity to analyze a meaningful sample of ceramics on a DelDOT project, and the data on textiles developed from clay impressions of ceramic surfaces will have some important applications for several research issues. Several studies (eg. - Peterson and Hamilton 1984; Adovasio 1983) have shown that textiles and cordage twists can be used to identify ethnic groups. The limited Lewden Green data show that for Woodland II Minguannan Complex groups, Z-twists are more common than S-twists by a ration of 3 to 1. Research currently in process (Custer n.d.) seems to indicate that most ceramics predating A.D. 1000 are characterized by S-twist cordages. The shift from S- to Z-twists is of interest because recent studies (Custer 1989:308-311) have suggested that there may be a population movement, or migration, during late Woodland I times in the coastal Middle Atlantic region. Further studies will be needed to see if larger samples of textile and cordage twist data

show technological discontinuities to match the population discontinuities.

#### **WOODLAND II ADAPTATIONS**

The Woodland II occupation at the Lewden Green Site shows some important similarities to other Woodland II Minguannan Complex sites. Lewden Green had no sub-surface features and neither do any of the other known Minguannan Complex base camps (Custer 1989:315-316; Stewart, Hummer, and Custer 1986). Minguannan Complex habitation sites, both large and small, also lack clear-cut patterns of differential spatial utilization beyond the habitation/processing dichotomy seen at Lewden Green. The absence of features and differential spatial utilization suggests that these habitation sites were not hamlets or villages. Rather, they seem to have been base camps, often with multiple overlapping occupations. The Lewden Green Site is quite similar to the other Woodland II base camps in this respect.

#### **CULTURAL RESOURCE MANAGEMENT RECOMMENDATIONS**

Phase II excavations at the Lewden Green Site show that there are no intact archaeological deposits at the site. Therefore, the site is not considered to be eligible for listing on the National Register of Historic Places and no further work is recommended at the site.