APPENDIX J:

ARCHAEOBOTANICAL ANALYSES

RESULTS OF ANALYSIS

FLOTATION-RECOVERED BOTANICAL REMAINS FROM THE FREDERICK LODGE COMPLEX (7NC-J-97, 7NC-J-98, AND 7NC-J-99)

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INTRODUCTION

Flotation processing of cultural soils for the recovery of plant macro-remains was conducted at 3 sites in the Frederick Lodge Complex: Sites 7NC-J-97, 7NC-J-98 and 7NC-J-99. A variety of feature types including hearth features, fire-cracked-rock (FCR)-related features, and basin features were sampled. In addition, soil samples were secured from non-feature, culture-bearing strata associated with lithic bifurcate reduction.

Ten soil samples were processed for macrobotanical analysis (Table J-1). One feature (Feature 23) was sampled at Site 7NC-J-97. A total of 7 soil samples were submitted from Features 2, 10, 30, and 32 and from 3 non-feature contexts at Site 7NC-J-98. Two non-feature samples were submitted for analysis from Site 7NC-J-99.

Table J-1. Macrobotanical Samples Processed from the Frederick Lodge Site Complex

Site	Provenience	Locus	Horizon	Catalog No.	Comments
7NC-J-97	N205 E664	H- Feature 23	I2	5011	Fishtail Hearth
7NC-J-98	N285 E575	B- Feature 2	B1	5001	FCR pedestals
7NC-J-98	N293 E546	D- Feature 32	0	5004	Woodland II
7NC-J-98	N296 E540	D- Feature 30	B1	5005	FCR pedestals
7NC-J-98	N294 E551	D	B2	5028	Bifurcate level
7NC-J-98	N294 E552	D	B2	5029	Bifurcate level
7NC-J-98	N296 E549	D	B2	5032	Bifurcate level
7NC-J-98	N306 E567	E- Feature 10	II7	5036	Large Basin
7NC-J-99	N219 E720	I	B1	5014	Bifurcate level
7NC-J-99	N221 E717	I	B2	5016	Bifurcate level

METHODS

Soil samples were routinely collected during field excavation. Samples usually measured 2 liters in volume, although 2 samples from Site 7NC-J-98 measured only 1 liter in volume. Samples were obtained from unscreened fill secured from across the base of stratigraphic levels. Soil samples were thoroughly dried, then packed for storage in vinyl bags.

Soil samples were individually processed using a Flote-Tech machine-assisted flotation system equipped with 0.325mm fine fraction and 1.0mm coarse fraction screens. The Flote-Tech system is a multi-modal flotation system which facilitates the separation and recovery of plant remains from the soil matrix via agitation in water, combined with forced air delivered through submerged valves. Processing resulted in two size fractions (heavy and light). Resulting floted portions were air dried.

Each processed sample was passed through geologic sieves to separate size fractions of recovered plant remains. The greater-than-or-equal-to 2 millimeter fraction was examined with a binocular microscope under low magnification (10X to 40X) and sorted into broad categories of material. Non-botanical remains were separated as an aggregate ("remainder") and not further categorized. All carbonized plant remains and all non-carbonized seeds were sorted into taxonomic categories (wood, seed, amorphous carbon). The less than 2 millimeter fraction was scanned for seeds and the remains of cultivated plants, which were removed for analysis. Weights and specimen counts were recorded for each category of vegetative material.

Identifications were attempted on all plant materials recovered. Identifications were made to the genus level when possible, to the family level when limited diagnostic morphology was available, and to the species level only when the assignment could be made with absolute certainty. When botanical specimens were so eroded or fragmentary that recognition was impossible, a variety of general categories were used to reflect degrees of general classification: Non-specific wood categories within the analyzed assemblages include *'ring porous'*, where specimens exhibited differences between early and late wood growth; *'deciduous taxa'*, where specimens could be identified as having a porous vessel arrangement reflecting deciduous trees rather than a trachid arrangement indicative of coniferous taxa; and *'unidentifiable'*, where specimens were so fragmentary or minute that no clear section could be obtained upon which to base identification. The term *'amorphous carbon'* was used to classify carbonized remains of plant origin which lacked any distinctive morphology.

Identifications were accomplished under low magnification (10X to 30X) with the aide of standard texts (Martin and Barkely 1961; Panshin and deZeeuw 1980; USDA 1956; Hoadley 1990). Identifications were secured using modern plant specimens from a reference collection representative of the flora of New Castle County, Delaware. Specimens were weighed using an electronic balance accurate to 0.01 grams.

RESULTS OF ANALYSIS

Sample matrices across the Frederick Lodge Complex sites were consistently composed of quartzitic gravel and heavy sands. Fresh rootlets were abundant in all processed samples, and insect egg cases and body fragments were noted. Recovered plant remains include native deciduous and coniferous wood charcoal, a single carbonized seed fragment, non-carbonized seeds, and unidentifiable amorphous charcoal. Below, results of analysis for each of the three Frederick Lodge Complex sites are briefly discussed. A detailed inventory of flotation-recovered plant remains is presented by site in Table J-2.

Site 7NC-J-97

A single soil sample was submitted from Feature 23 at Site 7NC-J-97. Flotation processing of 2 liters of feature soil yielded 0.03 grams of charcoal, or an average density of 0.015 grams of charcoal per liter of feature fill. Recovered plant macro-remains include 3 fragments of unidentifiable wood charcoal, a carbonized bayberry *(Myrica sp.)* seed fragment, and 13 non-carbonized seeds (carpetweed *[Mollugo verticillata]*, panic grass *[Panicum sp.]*, and grass *[POACEAE]*).

Table J-2. Frederick Lodge Site (7NC-J-97, 7NC-J-98, 7NC-J-99) Archaeobotanical Findings.

											TOTALS
Soil Sample Number	5011	5001	5036	5005	5004	5028	5032	5029	5014	5016	10 samples
Block			E	D		D		D	trench I	I	
Provenience	N205 E664	N285 E575-576	N306 E567	N296 E540	N298 E546	N294 E551	N296 E549	N294 E552	N219 E720	N221 E717	
Feature	23	2	10	30	32						
Strata	I	B	II	B		B	B	B	B	B	
Level	2	1	7	1		2	2	2	1	2	
Soil Sample Volume (liters)	2	2	2	2	1	1	2	2	2	2	18
Total Charcoal Weight (grams)	0.03	<0.01	0.02	0	0.08	0.03	0.02	0.01	0	0	0.19
WOOD CHARCOAL (total count)	3	1	3	0	7	5	0	3	0	0	22
total weight (grams)	0.01	<0.01	0.02	0	0.08	0.03	0	0.01	0	0	0.15
Pinus sp. (pine)			1		2						3
Quercus sp. (oak)		1									1
deciduous taxa			2								2
ring porous					2						2
unidentifiable	3				3	5		3			14
total fragments identified	3	1	3	0	7	5	0	3	0	0	22
CARBONIZED SEED REMAINS (total count)	1	0	0	0	0	0	0	0	0	0	1
total weight (grams)	0.02	0	0	0	0	0	0	0	0	0	0.02
Myrica sp. fragment (bayberry)	1										1
NON-CARBONIZED SEED REMAINS (total count)	13	29	21	27	3	17	7	36	99	49	301
Acalypha sp. (three-seeded mercury)				1			1	1			3
Amaranthus sp. (pigweed)										1	1
Mollugo verticillata (carpetweed)	5	8		5					12	3	33
Panicum sp. (panic grass)	1	4							1	2	8
POACEAE (grass family)	7	16	21	21	3	17	6	35	86	43	255
POLYGONACEAE (knotweed family)		1									1
OTHER PLANT REMAINS (total count)	0	0	0	0	0	0	2	0	0		2
total weight (grams)	0	0	0	0	0	0	0.02	0	0		0.02
amorphous carbon							2				2

Site 7NC-J-98

Seven soil samples were submitted from both feature and non-feature contexts at Site 7NC-J-98. Flotation processing of 12 liters of feature soil yielded 0.16 grams of charcoal, or an average density of 0.013 grams of charcoal per liter of cultural fill. Recovered plant remains include coniferous and deciduous wood, a variety of non-carbonized seeds and unidentifiable amorphous charcoal.

Wood charcoal was present in 5 of the 7 analyzed samples, and accounted for 88 per cent (by weight) of the macro-botanical material recovered from site 7NC-J-98. A total of 19 carbonized wood fragments weighing 0.14 grams was recovered. Pine *(Pinus sp.)* (3 fragments) and oak *(Quercus sp.)* (1 fragment) woods were identified. The remainder of the charcoal was minute and in poor condition and was classified as ring porous (2 fragments), deciduous taxa (2 fragments), and unidentifiable (8 fragments).

Non-carbonized seed remains were recovered from 100 per cent of the flotation samples analyzed from Site 7NC-J-98. Species identified include three-seeded mercury *(Acalypha sp.)* (3 seeds), carpetweed *(Mollugo verticillata)* (13 seeds), panic grass *(Panicum sp.)* (4 seeds), grass *(POACEAE)* (119 seeds) and knotweed *(POLYGONACEAE)* (1 seed).

Two fragments of amorphous carbon were also recovered from one of the non-feature flotation samples (ss#5032).

Site 7NC-J-99

The two soil samples submitted from 7NC-J-99 contained a total of 4 liters of non-feature sediment which yielded a paucity of carbonized plant remains. Non-carbonized seeds were present in abundance (a total of 148 seeds) in both processed samples. Seed species identified included pigweed *(Amaranthus sp.)* (1 seed), carpetweed *(Mollugo verticillata)* (15 seeds), panic grass *(Panicum sp.)* (3 seeds), and unidentified grasses *(POACEAE)* (129 seeds).

SUMMARY AND RECOMMENDATIONS

Analysis of this suite of 10 flotation samples from the 3 sites comprising the Frederick Lodge Complex documents the presence of scant but persistent carbonized plant remains relating to prehistoric occupations as well as the infiltration of modern seeds into archaeological contexts. The presence of non-carbonized seed remains within prehistoric flotation samples from open-site environments is generally an indicator of modern seed contamination (Minnis 1981; Keepax 1977; Smith 1985), usually as a result of rodent or insect burrowing, root action and decay, or downwashing. Across the Frederick Lodge Complex, non-carbonized and non-native seeds were abundant. All identified seeds represent plants common to disturbed environments. These data concur with a similar pattern observed at numerous other prehistoric sites across Delaware (Custer et al. 1996a; Custer et al. 1996b; LeeDecker et al. 1998; Petraglia et al. 2002; Bowen and Knepper 2003).

The overall scarcity of archeobotanical materials from the Frederick Lodge Sites severely limits the interpretation of cultural plant use and local landscape conditions relating to the Complex. The single bayberry *(Myrica sp.)* seed fragment from Site 7NC-J-97 is perhaps the most interesting plant artifact recovered. Its presence may reveal the use of the plant (two species *Myrica pennsylvanica* and *M.*

cerifera are native to the project area) which had a multitude of medicinal and technological applications (wax can be extracted from the berries) (Erichsen-Brown 1979).

The small sample size from sites 7NC-J-97 and 7NC-J-99 (1 and 2 samples, respectively) precludes rigorous comparison of the plant macro-remains recovered from the three sites. Although we can say that the consistency among the non-carbonized seed assemblages from the 3 sites suggests that the same factors may have influenced the subterranean movement of minute articles within cultural deposits throughout the Complex.

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